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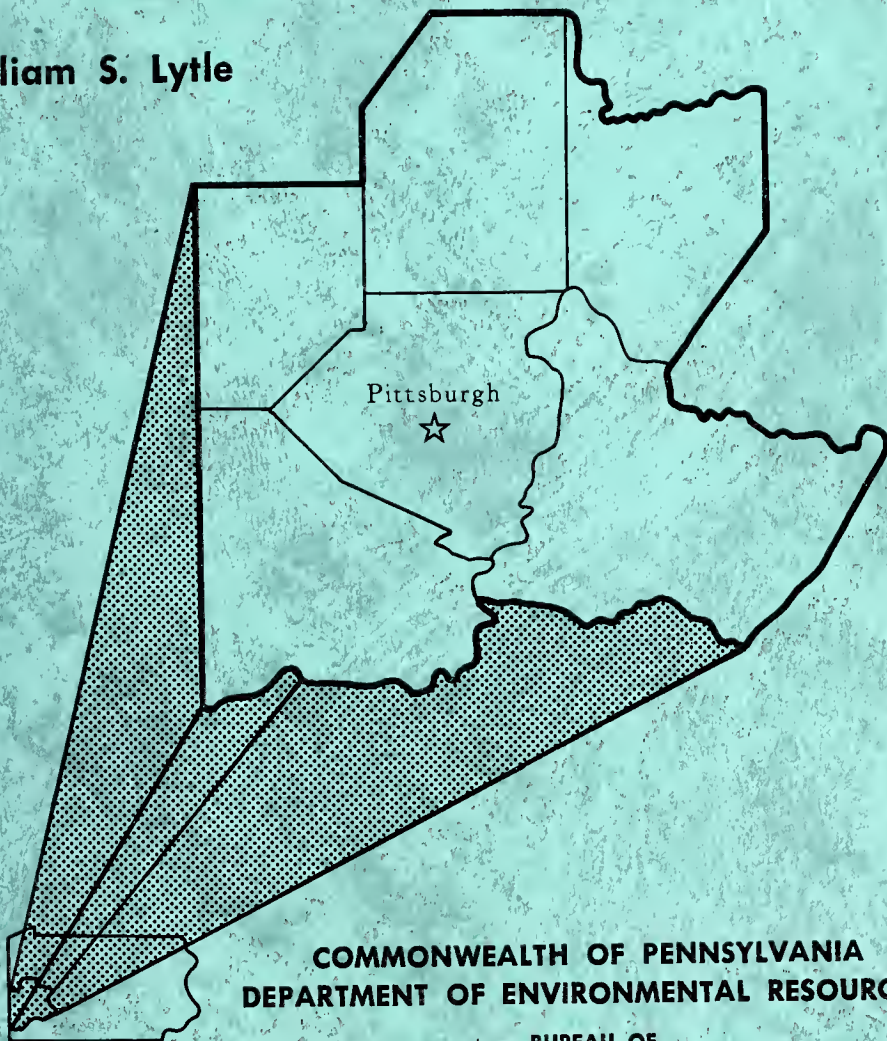
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OIL FIELDS OF THE GREATER PITTSBURGH REGION

William S. Lytle



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES

BUREAU OF
TOPOGRAPHIC AND GEOLOGIC SURVEY

Arthur A. Socolow, State Geologist

IN COOPERATION WITH

UNITED STATES

DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

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OIL FIELDS OF THE GREATER PITTSBURGH REGION

by William S. Lytle
Pennsylvania Geological Survey

**Prepared by the Pennsylvania Geological Survey
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PREFACE

Soon after the Drake well proved that commercial oil production could be obtained by drilling into the oil reservoirs, southwestern Pennsylvania became a very active area for oil exploration and production. This area was very productive into the twentieth century, when oil production started to decline, but it is at present at a very low level. Many of the areas where oil derricks were once numerous are now occupied by cities and towns, and the derricks have vanished.

Today energy is in short supply, especially our main source of energy—petroleum. Therefore it is imperative to know the amount of oil remaining in the reservoirs and the amount that can be produced by different methods of recovery. This report presents data on each reservoir in the six county area of Allegheny, Armstrong, Beaver, Butler, Washington, and Westmoreland Counties. An attempt was made to determine the amount of oil left in the ground and the amount that could be produced by secondary methods. Although much information is available on the reservoirs, there are still too many unknowns to calculate completely accurate reserve figures. Therefore reserves were estimated from the extrapolation of county oil production decline curves.

This report will be of use to oil operators, professional geologists, planners in the area, highway and construction engineers, and students of geology and oil history. Oil operators and professional geologists desiring to develop the area, operate secondary recovery projects, or explore for new oil will be able to use the data to further their particular interests. Planners and those engaged in construction will need to know the areas where consideration should be given to valuable oil property. Students of geology and oil history will better understand the oil geology of the area and the events during the early days of oil in Pennsylvania and the United States.

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OIL FIELDS OF THE GREATER PITTSBURGH REGION

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ABSTRACT

Westmoreland County is the only county that has not had considerable crude oil production from the 92 oil reservoirs in the six county area of the Greater Pittsburgh Region. All six counties have produced large volumes of gas. This report deals only with the oil reservoirs for which data sheets have been compiled.

Wells having the largest initial productions in the State are located in this area. The largest well has produced over 1,000,000 barrels of crude oil and is still producing. Petroleum production in these counties started in the early 1860's and is continuing at a very low rate. Allegheny County had produced over 79 million barrels by January 1, 1976, and Washington County had produced over 71 million barrels.

The McDonald field and Washington-Taylorstown field have secondary recovery gas drive projects in operation. Both projects have been very successful. This study shows that there are still too many unknowns with respect to the reservoirs for accurate determination of the secondary reserves of crude oil. Therefore, the proven reserves to the year 2000 were estimated by extrapolating the production decline curve for each county. With current operations, the county yields projected to the year 2000 are: Allegheny 770,000 barrels; Armstrong 168,600 barrels; Beaver 58,070 barrels; Butler 987,000 barrels; and Washington 1,690,000 barrels. This makes the total projected production for the area 3,680,670 barrels to the year 2000.

Additional gas drive projects and successful water flooding would increase the proven reserves in the area dramatically. Preliminary studies indicate that oil saturations in these reservoirs are higher than those in the reservoirs of the Middle District of Pennsylvania consisting of Clarion, Forest, and Venango Counties.

INTRODUCTION

GENERAL STATEMENT

The Bureau of Topographic and Geologic Survey of the Pennsylvania Department of Environmental Resources, in cooperation with the United States Geological Survey, has published a number of maps and reports in

an environmental study of the Greater Pittsburgh Region, which includes the counties of Allegheny, Armstrong, Beaver, Butler, Washington, and Westmoreland. This report describes the oil fields in the Greater Pittsburgh Region and is a companion report to the *Greater Pittsburgh Region Oil and Gas Fields Map* published as Map 44 by the Pennsylvania Survey (Lytle and Balogh, 1975).

ACKNOWLEDGEMENTS

The material for this report was obtained from the many reports on Pennsylvania's oil fields published by the Bureau of Topographic and Geologic Survey of Pennsylvania and the United States Geological Survey. Each oil field sheet lists the references used to obtain the data for the particular field. Additional information was obtained from the petroleum operators in the oil fields.

OBJECTIVE OF THE STUDY

The objective of the study was to provide information on the oil fields of the area in a form that could be used by planners, geologists, engineers, and petroleum operators for evaluation purposes. To reach the objective, the following are provided:

- (1) A description of each oil field;
- (2) Statistics on producing wells and crude oil production by county;
- (3) Crude oil reserves in some form.

SOURCES OF INFORMATION

This report was compiled using information from publications of the Second, Commission (Third), and Fourth Pennsylvania Geological Surveys, the Pennsylvania Bureau of Statistics, the U. S. Geological Survey, the U. S. Bureau of Mines, and various technical journals. Data were also obtained from oil producers and unpublished reports.

All statistics from 1886 to 1918, unless indicated otherwise, were taken from *Mineral Resources of the United States*, published by the U. S. Geological Survey. Figures for 1921 to 1948 are from *Reports on Productive Industries, Public Utilities, and Miscellaneous Statistics*, by the Bureau of Statistics of Pennsylvania. All county production figures reported by the Bureau of Statistics represent crude oil produced within county limits. Statistics on the production of individual fields are not available. Pennsylvania Geological Survey Mineral Resource Report 19, *Contributions to Oil and Gas Geology of Western Pennsylvania* (Sisler

and others, 1933), summarizes the production figures to 1932. Mineral Resource Report 32, *Crude Oil Reserves of Pennsylvania* (Lytle, 1950), was relied on heavily for field data.

METHOD OF STUDY

A standard form has been adopted for reporting data on individual fields. In some cases, fields in the same area and with similar characteristics are grouped and reported on a single form. The original field name is used in most cases, but where a group of fields are reported together, a field name combining two or more fields is sometimes used.

The location of the field can be found by referring to the field number on Map 44 (Lytle and Balogh, 1975). Two errors appear on Map 44. The Hooker field should be numbered 132 and the Hoover field 135 on the map, instead of 135 and 132 respectively. Also, the number for Rough Run is 144.

The discovery date, the name of the discovery well, and the initial production of the discovery well are recorded when known.

The fields are grouped by counties, and the township, county, and 7½-minute quadrangle in which the field is located are reported. When a field lies in more than one county of the six in the Greater Pittsburgh Region, it is reported under the county in which most of the field is located, and the names of the county and township in which the rest of the field lies are shown in parentheses. If part of the field is located in a county other than one in the Greater Pittsburgh Region, only that part of the field in the Greater Pittsburgh Region is reported. The Bureau of Statistics of Pennsylvania reports production by counties, and these statistics were used to compile the county production decline curve to arrive at a proven crude oil reserve figure.

The number of producing wells and the number of abandoned wells are recorded when available, but such figures are lacking for many fields. Sand names, taken from manuscripts and published reports, and productive acreage, determined by planimeter from maps showing productive limits, are recorded for each field, producing or inactive.

Most of the oil-producing sands, as listed on the field data sheets, are shown on the generalized columnar section of Map 44 (Lytle and Balogh, 1975). Those sands not shown on the columnar section are the Lower Connoquenessing, which is the bottom part of the Connoquenessing Formation; the Berea, whose top is about 30 feet above the Murrysville Sandstone; the First, which is correlative with the Hundred Foot; the Red Valley, correlative with the Rosenberry; the Second and Thirty Foot, correlative with the Upper Nineveh; the Snee, correlative with the Lower

Nineveh; the Boulder and Knox Third, correlative with the Gordon Stray; the Knox Fourth and Shira, correlative with the Gordon; and the Third, located just above the Fourth.

ESTIMATION OF OIL RESERVES

GENERAL STATEMENT

Reserve figures can be calculated from core information. In general, a volumetric method is used in estimating the oil reserves. The necessary data collected, determined, or estimated are the average thickness of pay sand, the oil saturation of the pay sand in barrels per acre-foot, and the number of acres of oil-bearing sand. The product of these factors is the estimated total oil content. Using the same procedure and substituting the amount of oil recoverable in barrels per acre-foot for oil saturation in barrels per acre-foot, the quantity of oil recoverable is determined.

Very few cores have been taken in the Greater Pittsburgh Region. In Mineral Resource Report 32 (Lytle, 1950), the available core data were used in an attempt to calculate meaningful crude oil reserve figures for this area. Much more is now known about the calculation of reserves than at that time, and the figures published in that report are too low. Still, there are not enough data available to determine accurately such information as the original oil saturation of the reservoir, the number of barrels recovered by primary methods, or the amount of oil recoverable by secondary recovery methods.

Figure 1 is the plot on semi-log paper of the annual production of crude oil from the Wallace Heirs lease in the McDonald field. This is one lease for which production figures were accurately kept. The primary production was extrapolated to the year 1942, the assumed limit of economic production, when each well would be producing one third of a barrel of oil per day. The total cumulative primary production at that time was estimated to be 458,716 barrels. This information is published in Mineral Resource Report 29 of the Pennsylvania Geological Survey (Ingham and others, 1949, p. 41-53).

Natural gas recycling was started on the Wallace Heirs lease in 1932, and the production of oil reached a peak in 1936 of 13,279 barrels for the year. For the next 12 years, until 1948, the production declined again and then leveled off in that year, and the annual production has remained between 6,000 and 8,000 barrels over the past 26 years. The amount of oil produced annually by this lease from 1948 to 1974 was furnished to the Survey through the courtesy of the Waverly Oil Works Company McDonald Division.

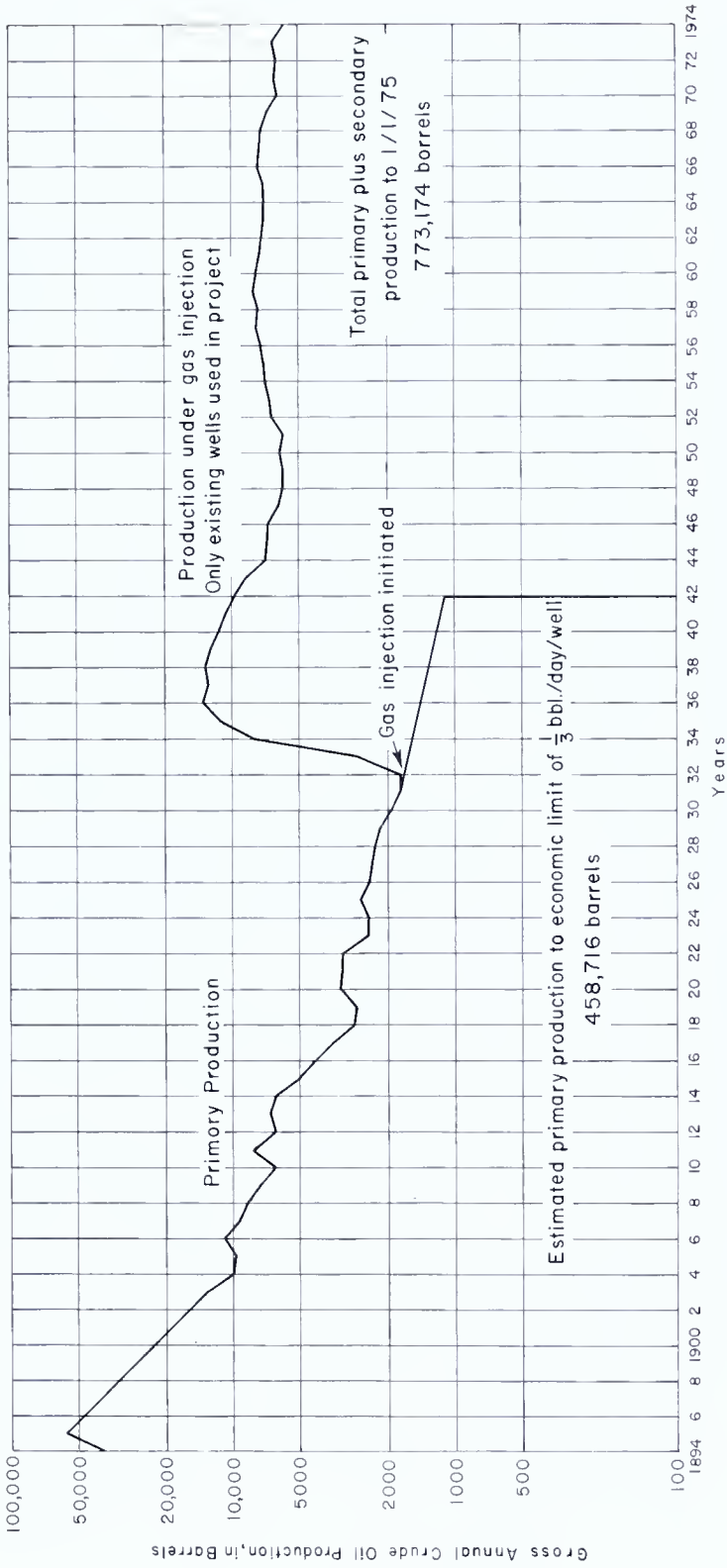


Figure 1. Crude oil production decline curve of the Wallace Heirs lease, McDonald field.

The constant production of about 7,000 barrels annually since 1948 from the Wallace Heirs lease indicates that: 1) the oil saturation of the Gordon sand is much higher than saturations of the average sand in northern Pennsylvania, where many secondary recovery projects have been operated successfully, or 2) oil from surrounding properties has migrated in the reservoir to the producing wells on the Wallace Heirs lease due to the recycling of gas on the adjacent leases, or 3) the oil is being produced from a greater thickness of sandstone than realized, or 4) in addition to primary porosity in the reservoir there may be fracture porosity, or 5) a combination of these factors.

At the end of 1942 the produced oil from this lease had amounted to 269 barrels per acre-foot by primary methods, and at the end of 1974, 184 barrels per acre-foot by secondary methods, or a total of 453 barrels per acre-foot. Operators in those oil fields where many cores have been taken have arrived at an average figure of 600 barrels per acre-foot as the original oil saturation of the producing horizons. As a rule of thumb, they have also used a percentage recovery factor of 10 percent primary recovery and 10 percent recovery by secondary gas drive. The Wallace Heirs lease should recover a total of at least 500 barrels per acre-foot, a minimum figure. If this figure is considered as 20 percent of the original oil content and extrapolated backward, a figure of about 2,500 barrels per acre-foot for the original oil saturation results. This saturation is a great deal larger than the one usually used by the operators. Therefore, we apparently still do not have enough known accurate data to determine the crude oil reserves for this area.

Total oil produced in Allegheny County to date amounts to about 200 barrels per acre-foot, or an original oil saturation of about 2,000 barrels per acre-foot, if it is assumed that only 10 percent of the oil has been produced. Using the same assumption for Washington County, the total oil produced to date amounts to about 150 barrels per acre-foot, or an original oil saturation of about 1,500 barrels per acre-foot. The Thorn Creek field had produced 2,412,000 barrels at the end of 2½ years. There is 19,650 acre-feet of reservoir sand in the field. Therefore, on March 1, 1887, the field had already produced 123 barrels per acre-foot, and it produced for many years after that date. Using this (123 barrels per acre-foot) as a base for estimating the original oil content of the field, the original oil saturation would amount to 1,230 barrels per acre-foot.

From these estimates it can be seen that the crude oil reserves by field for the Greater Pittsburgh Region cannot be calculated accurately unless considerably more and better data become available. Until that time, the reserves should be estimated on a county basis by extending the production decline curves of each county.

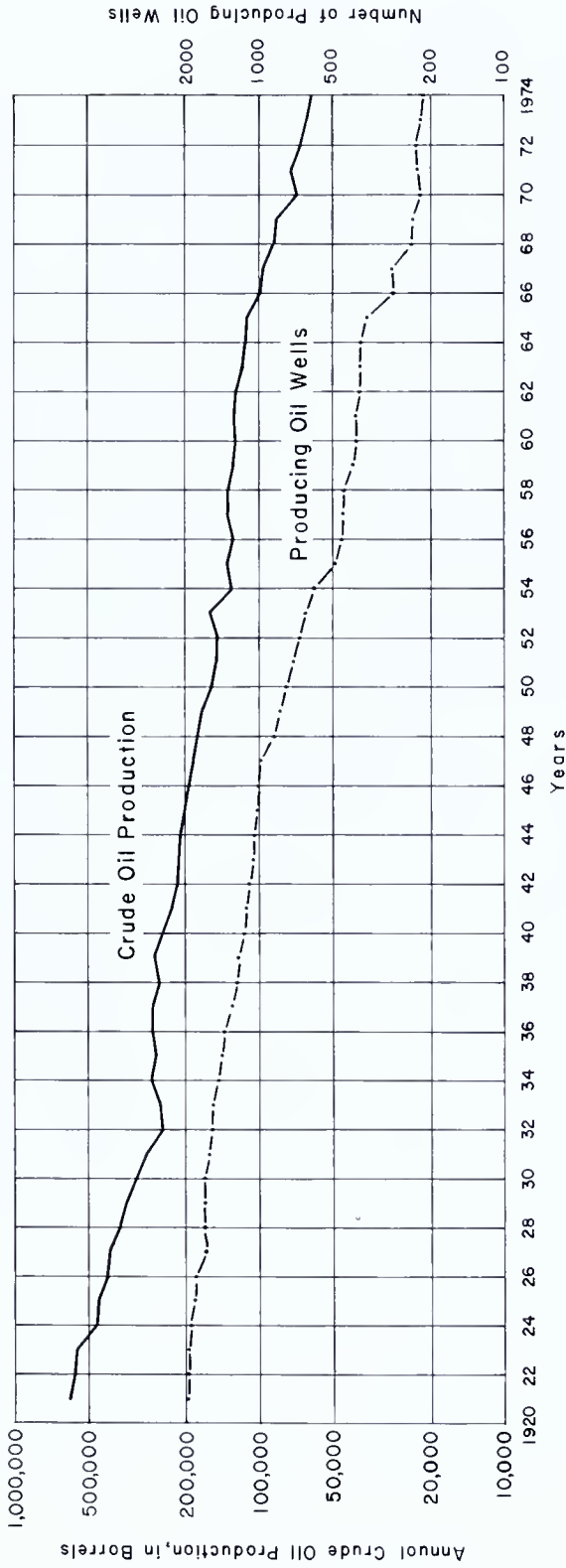


Figure 2. Allegheny County crude oil production decline curve.

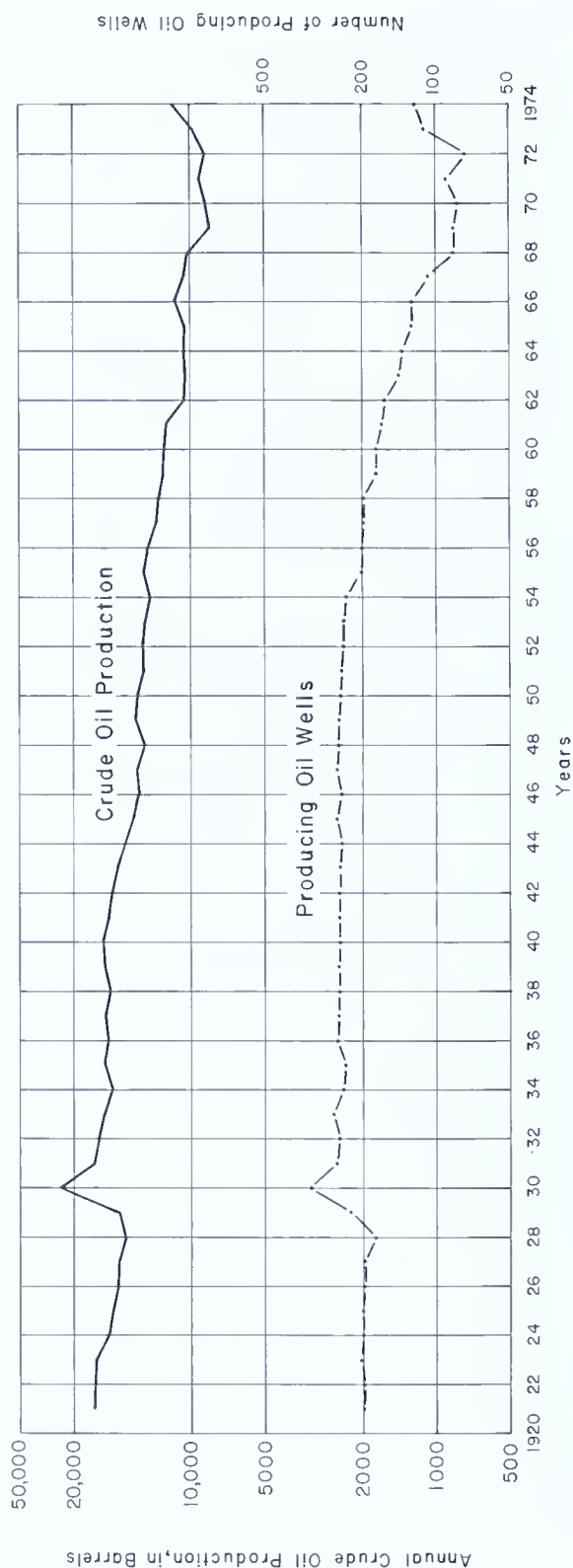


Figure 3. Armstrong County crude oil production decline curve.

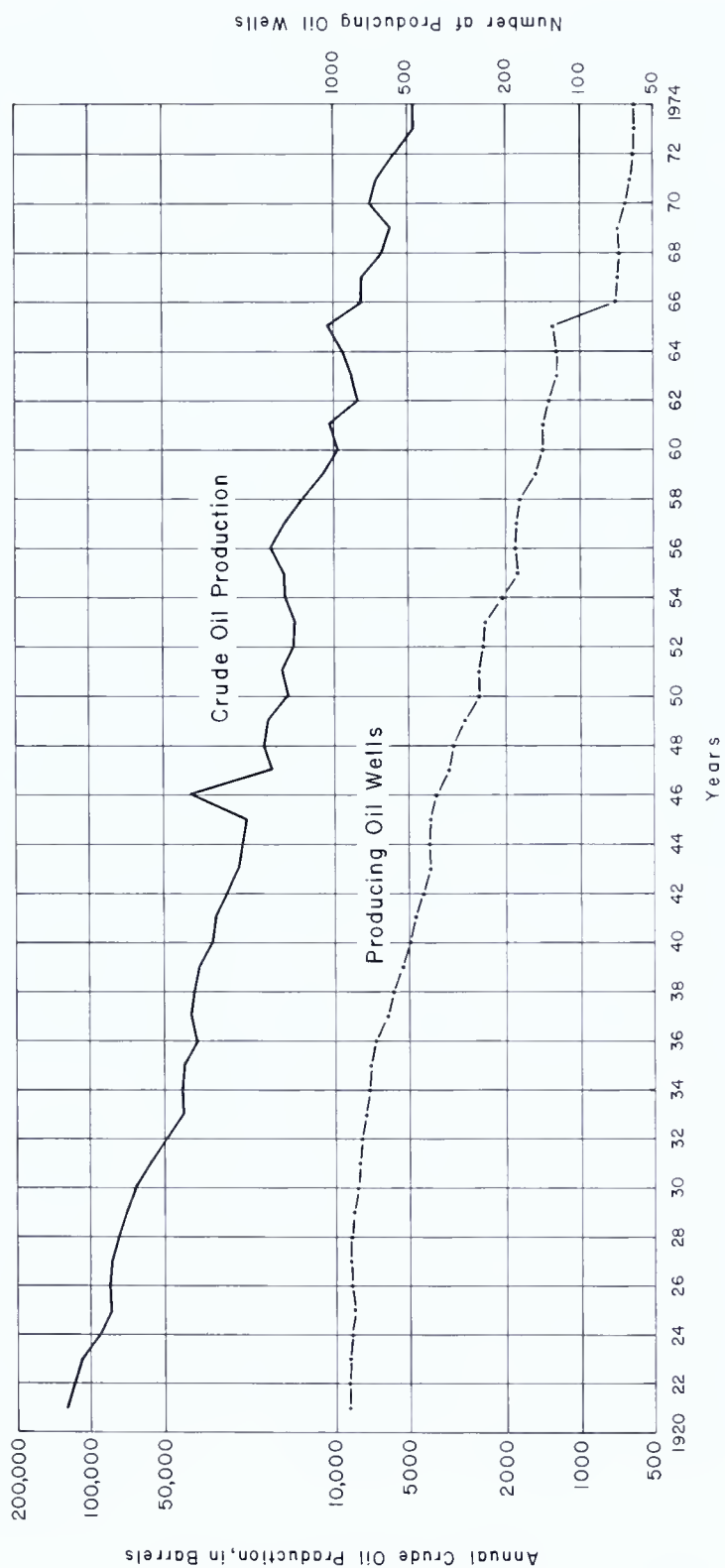


Figure 4. Beaver County crude oil production decline curve.

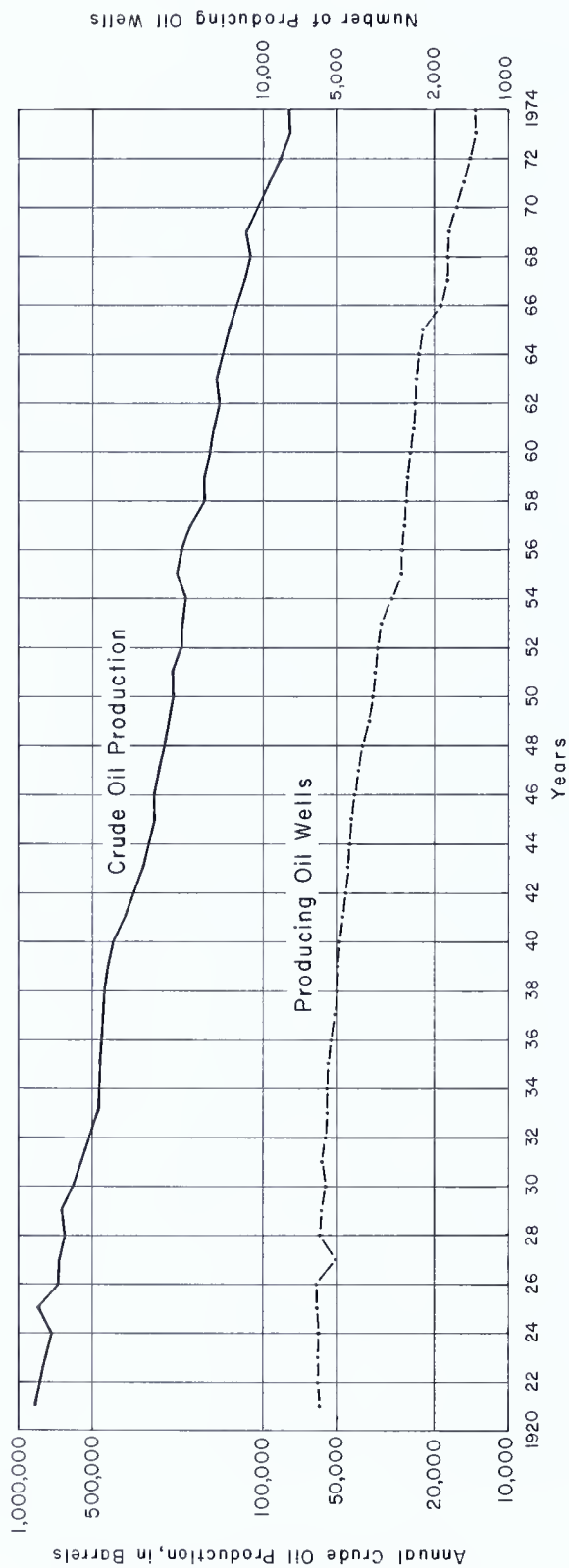


Figure 5. Butler County crude oil production decline curve.

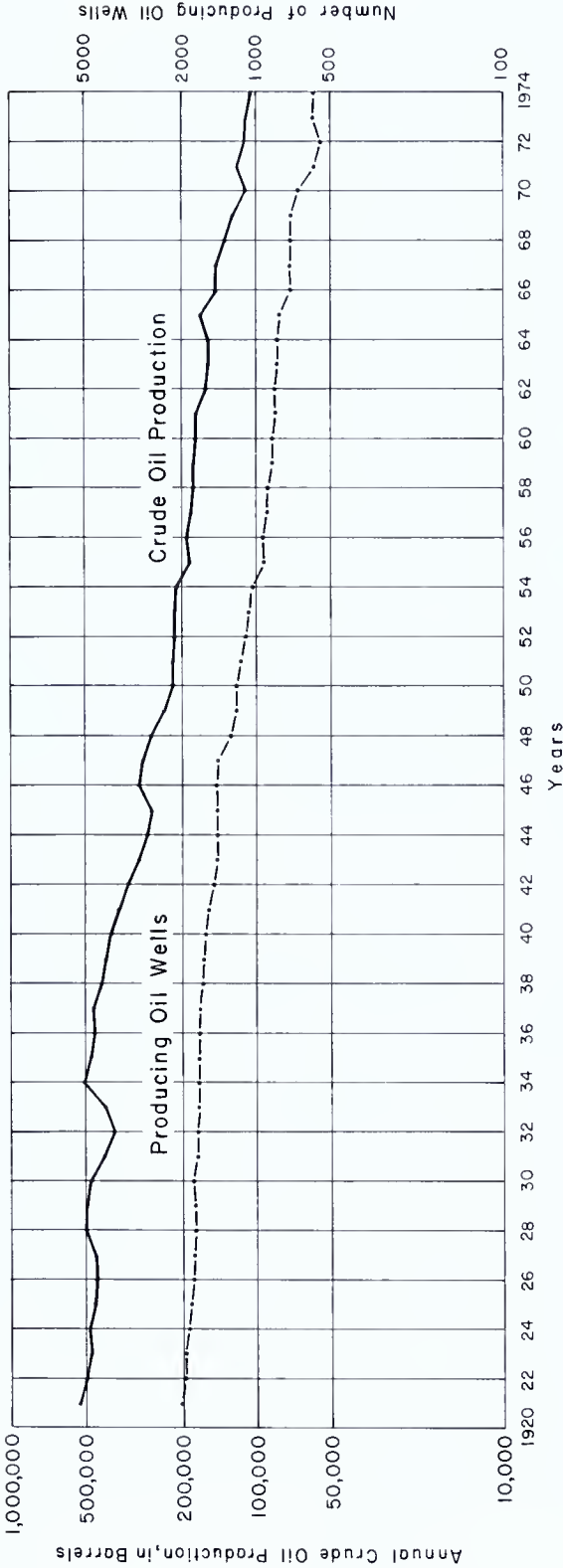


Figure 6. Washington County crude oil production decline curve.

Production statistics on a few fields have been assembled, but they are inaccurate. The annual production statistics by county, Tables 1 through 6, have been gathered over the past years, but here again, they are not available for all years and therefore cannot be used to compute the reserves.

In order to present a proven reserve figure that can be used for planning purposes, annual crude oil production figures for each county were plotted on semi-log paper (Figures 2 through 6), and the decline in production was extrapolated to the year 2000. The estimated annual production of oil was then read off the curve for each county and was recorded on Table 7. In using this method, it is assumed that the conditions prevailing today in the oil fields, such as number of producing wells, producing methods, number of secondary recovery projects, etc., will remain the same through the entire period to the year 2000. If any one of the conditions is changed, then the reserves will be increased or lowered depending on the change.

By the production decline curves as used for Table 7, the estimated oil reserves by county to the year 2000 are as follows: Allegheny 777,000 barrels; Armstrong 168,600 barrels; Beaver 58,070 barrels; Butler 987,000 barrels; Washington 1,690,000 barrels. This makes an estimated total of reserves for the Greater Pittsburgh Region of 3,680,670 barrels to the year 2000.

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APPENDIX A

TABLE I
WELLS AND CRUDE OIL PRODUCTION IN ALLEGHENY COUNTY

Year	Total Wells Producing	Total Annual ¹ Production (bbls.)	Av. Annual Prod. per well (bbls.)	Av. Daily Prod. per well (bbls.)
1889		541,092		
1890		2,707,039		
1891		10,317,258		
1892		10,196,856		
1893		5,488,792		
1894		4,559,342		
1895		3,864,111		
1896		4,380,007		
1897		2,958,540		
1898		2,301,651		
1899		1,988,754		
1900		1,706,886		
1901		1,440,967		
1902		1,376,212		
1903		1,187,496		
1904		1,008,977		
1905		918,224		
1906		902,253		
1907		Statistics not available		
1908		Statistics not available		
1909	1,728			
1910	1,743			
1911	1,688			
1912	1,664			
1913	1,680			
1914	1,729			
1915	1,756			
1916	1,750			
1917	1,741			
1918	1,713			
1919		Statistics not available		
1920		Statistics not available		
1921	1,973	598,480	303	.83
1922	1,970	574,552	292	.80
1923	1,958	561,398	287	.79
1924	1,905	467,265	246	.67
1925	1,863	453,648	244	.67
1926	1,835	422,797	230	.63
1927	1,664	406,771	245	.67
1928	1,695	375,062	221	.61
1929	1,690	349,497	207	.57
1930	1,687	326,050	193	.53
1931	1,606	293,685	183	.50
1932	1,580	250,042	158	.43
1933	1,549	254,527	164	.45
1934	1,480	275,842	186	.51

TABLE I
WELLS AND CRUDE OIL PRODUCTION IN ALLEGHENY COUNTY - Continued

Year	Total Wells Producing	Total Annual ¹ Production (bbls.)	Av. Annual Prod. per well (bbls.)	Av. Daily Prod. per well (bbls.)
1935	1,421	267,955	189	.52
1936	1,385	273,213	197	.54
1937	1,299	271,392	209	.57
1938	1,251	254,614	203	.56
1939	1,223	269,240	220	.60
1940	1,176	247,571	210	.58
1941	1,153	224,118	194	.53
1942	1,113	216,696	195	.53
1943	1,078	214,711	199	.55
1944	1,065	212,988	200	.55
1945	1,033	204,865	198	.54
1946	1,017	196,113	193	.53
1947	982	186,747	190	.52
1948	878	181,135	206	.57
1949	827	173,346	210	.57
1950	784	155,430	198	.54
1951	734	150,169	205	.56
1952	693	147,830	213	.58
1953	653	159,622	244	.67
1954	594	129,834	219	.60
1955	481	134,890	280	.77
1956	470	127,616	271	.74
1957	458	132,515	289	.79
1958	450	131,930	293	.80
1959	415	128,783	310	.85
1960	407	123,008	302	.83
1961	403	123,540	307	.84
1962	394	123,024	312	.85
1963	389	117,044	301	.82
1964	385	111,598	290	.79
1965	369	111,726	303	.83
1966	288	99,310	345	.94
1967	288	96,576	335	.92
1968	240	89,255	372	1.02
1969	236	85,750	363	1.00
1970	221	70,113	317	.87
1971	227	74,293	327	.90
1972	231	68,069	295	.81
1973	220	64,320	292	.80
1974	215	61,898	288	.79

1. Figures from 1889 to 1906 include the production of the McDonald pool, most of which lies in Washington County.

TABLE 2
WELLS AND CRUDE OIL PRODUCTION IN ARMSTRONG COUNTY

Year	Total Wells Producing	Total Annual Production (bbls.)	Av. Annual Prod. per well (bbls.)	Av. Daily Prod. per well (bbls.)
1909	171			
1910	178			
1911	179			
1912	170			
1913	168			
1914	185			
1915	184			
1916	188			
1917	205			
1918	196			
1919		Statistics not available		
1920		Statistics not available		
1921	197	24,807	126	.35
1922	197	24,788	126	.35
1923	203	24,266	120	.33
1924	202	21,350	106	.29
1925	201	20,093	100	.27
1926	197	19,718	100	.27
1927	198	19,420	98	.27
1928	180	18,319	102	.28
1929	222	19,564	88	.24
1930	323	34,435	106	.29
1931	254	24,788	97	.27
1932	249	23,262	94	.26
1933	261	22,576	86	.24
1934	240	20,957	87	.24
1935	236	22,211	94	.26
1936	252	21,855	87	.24
1937	251	22,157	88	.24
1938	249	21,270	85	.23
1939	248	22,136	89	.24
1940	249	22,715	91	.25
1941	249	21,543	86	.24
1942	248	20,894	84	.23
1943	246	19,988	81	.22
1944	244	18,597	76	.21
1945	252	17,003	68	.19
1946	246	16,238	66	.18
1947	252	16,453	65	.18
1948	250	15,316	61	.17
1949	248	16,455	66	.18
1950	245	16,483	67	.18
1951	243	15,643	64	.18
1952	240	15,751	66	.18
1953	242	15,137	63	.17
1954	235	14,711	63	.17

TABLE 2
WELLS AND CRUDE OIL PRODUCTION IN ARMSTRONG COUNTY - Continued

Year	Total Wells Producing	Total Annual Production (bbls.)	Av. Annual Prod. per well (bbls.)	Av. Daily Prod. per well (bbls.)
1955	201	15,471	78	.21
1956	201	14,937	74	.20
1957	197	13,801	70	.19
1958	197	13,224	67	.18
1959	177	12,961	73	.20
1960	175	12,763	73	.20
1961	167	12,552	75	.21
1962	161	10,355	64	.18
1963	141	10,349	73	.20
1964	137	10,516	77	.21
1965	124	10,616	86	.23
1966	124	11,229	91	.25
1967	108	10,516	97	.27
1968	85	10,217	120	.33
1969	84	8,311	99	.27
1970	81	8,696	107	.29
1971	90	9,207	102	.28
1972	76	8,793	116	.32
1973	110	9,769	89	.24
1974	120	11,859	99	.27

TABLE 3
WELLS AND CRUDE OIL PRODUCTION IN BEAVER COUNTY

Year	Total Wells Producing	Total Annual ¹ Production (bbls.)	Av. Annual Prod. per well (bbls.)	Av. Daily Prod. per well (bbls.)
1889		631,736		
1890		1,448,139		
1891		972,223		
1892		652,372		
1893		486,093		
1894		469,410		
1895		474,676		
1896		553,000		
1897		320,326		
1898		222,976		
1899		233,304		
1900		417,619		
1901		800,688		
1902		529,934		
1903		444,097		
1904		359,282		
1905		313,323		
1906		261,144		
1907		Statistics not available		
1908		Statistics not available		
1909	629			
1910	613			
1911	593			
1912	609			
1913	590			
1914	663			
1915	665			
1916	694			
1917	648			
1918	652			
1919		Statistics not available		
1920		Statistics not available		
1921	878	125,795	143	.39
1922	892	117,914	132	.36
1923	878	109,140	124	.34
1924	879	91,973	105	.29
1925	846	83,908	99	.27
1926	865	84,296	98	.27
1927	873	81,198	94	.26
1928	869	77,153	89	.24
1929	852	71,744	84	.23
1930	807	66,112	82	.22
1931	800	58,606	73	.20
1932	783	47,999	61	.17
1933	756	43,006	57	.16
1934	732	43,499	59	.16

TABLE 3
WELLS AND CRUDE OIL PRODUCTION IN BEAVER COUNTY - Continued

Year	Total Wells Producing	Total Annual ¹ Production (bbls.)	Av. Annual Prod. per well (bbls.)	Av. Daily Prod. per well (bbls.)
1935	715	42,374	59	.16
1936	684	36,669	54	.15
1937	609	38,214	63	.17
1938	576	37,695	66	.18
1939	536	35,896	67	.18
1940	499	31,597	63	.17
1941	471	30,415	65	.18
1942	436	27,571	63	.17
1943	408	24,571	60	.16
1944	410	23,628	58	.16
1945	408	21,956	54	.15
1946	386	38,362	99	.27
1947	339	18,146	54	.15
1948	327	19,393	59	.16
1949	296	18,719	63	.17
1950	257	15,676	61	.17
1951	257	16,322	64	.17
1952	249	14,639	59	.16
1953	242	14,396	59	.16
1954	205	15,652	76	.21
1955	178	16,037	90	.24
1956	182	18,152	100	.27
1957	182	15,966	88	.24
1958	175	13,534	77	.21
1959	150	11,116	74	.20
1960	141	9,824	70	.19
1961	140	10,278	73	.20
1962	131	8,058	62	.17
1963	122	8,432	69	.19
1964	122	9,258	76	.21
1965	127	10,576	83	.23
1966	72	7,749	108	.29
1967	69	7,770	113	.31
1968	69	6,410	93	.25
1969	69	5,904	86	.24
1970	65	7,202	111	.30
1971	61	6,657	109	.30
1972	60	5,643	94	.26
1973	60	4,525	75	.21
1974	60	4,572	76	.21

1. Figures from 1889 to 1906 include Beaver and Lawrence Counties.

TABLE 4
WELLS AND CRUDE OIL PRODUCTION IN BUTLER COUNTY

Year	Total Wells Producing	Total Annual Production (bbls.)	Av. Annual Prod. per well (bbls.)	Av. Daily Prod. per well (bbls.)
1909	5,493			
1910	5,351			
1911	5,116			
1912	5,268			
1913	5,469			
1914	5,605			
1915	5,620			
1916	5,341			
1917	5,432			
1918	5,295			
1919		Statistics not available		
1920		Statistics not available		
1921	5,944	874,878	147	.40
1922	6,040	825,366	136	.37
1923	6,052	781,402	129	.35
1924	6,022	735,900	122	.33
1925	6,090	846,151	139	.38
1926	6,105	689,782	112	.31
1927	5,120	677,004	132	.36
1928	5,909	646,942	109	.30
1929	5,795	679,752	117	.32
1930	5,581	606,211	108	.30
1931	5,750	564,330	98	.27
1932	5,589	526,848	94	.26
1933	5,484	482,912	88	.24
1934	5,483	466,973	85	.23
1935	5,423	467,130	86	.24
1936	5,273	457,375	87	.24
1937	5,133	450,787	88	.24
1938	5,022	446,834	89	.24
1939	4,957	431,019	87	.24
1940	4,847	408,122	84	.23
1941	4,755	368,175	78	.21
1942	4,632	338,598	73	.20
1943	4,505	312,675	69	.19
1944	4,419	296,744	67	.18
1945	4,384	278,381	64	.17
1946	4,199	278,994	67	.18
1947	4,103	267,615	65	.18
1948	3,929	256,818	65	.18
1949	3,696	242,450	66	.18
1950	3,634	233,568	64	.18
1951	3,539	235,765	67	.18
1952	3,445	216,671	63	.17
1953	3,293	215,572	65	.18
1954	2,989	209,093	70	.19

TABLE 4
WELLS AND CRUDE OIL PRODUCTION IN BUTLER COUNTY - Continued

Year	Total Wells Producing	Total Annual Production (bbls.)	Av. Annual Prod. per well (bbls.)	Av. Daily Prod. per well (bbls.)
1955	2,756	224,748	82	.22
1956	2,739	216,481	79	.22
1957	2,689	197,154	73	.20
1958	2,638	173,107	66	.18
1959	2,611	172,090	66	.18
1960	2,528	162,702	64	.18
1961	2,466	158,728	64	.18
1962	2,439	150,025	62	.17
1963	2,370	150,988	64	.17
1964	2,325	146,913	63	.17
1965	2,246	137,401	61	.17
1966	1,898	128,134	68	.18
1967	1,771	119,289	67	.18
1968	1,767	112,882	64	.18
1969	1,750	117,019	67	.18
1970	1,634	105,600	65	.18
1971	1,521	95,306	63	.17
1972	1,414	85,726	61	.17
1973	1,366	78,074	57	.16
1974	1,356	78,817	58	.16

TABLE 5
WELLS AND CRUDE OIL PRODUCTION IN WASHINGTON COUNTY

Year	Total Wells Producing	Total Annual ¹ Production (bbls.)	Av. Annual Prod. per well (bbls.)	Av. Daily Prod. per well (bbls.)
1886		3,189,822		
1887		2,859,344		
1888		2,322,190		
1889		3,848,145		
1890		3,900,487		
1891		2,997,278		
1892		2,452,388		
1893		2,077,564		
1894		1,720,780		
1895		1,676,676		
1896		1,975,169		
1897		2,175,712		
1898		1,742,677		
1899		1,460,036		
1900		1,375,341		
1901		1,300,399		
1902		1,396,831		
1903		1,199,838		
1904		1,149,847		
1905		1,149,536		
1906		1,287,714		
1907		Statistics not available		
1908		Statistics not available		
1909	1,822			
1910	1,765			
1911	1,792			
1912	1,728			
1913	1,662			
1914	1,818			
1915	1,850			
1916	1,855			
1917	1,830			
1918	1,825			
1919		Statistics not available		
1920		Statistics not available		
1921	2,005	531,117	266	.73
1922	1,972	499,893	253	.70
1923	1,983	474,765	239	.66
1924	1,906	478,483	251	.69
1925	1,879	455,554	233	.67
1926	1,836	449,493	245	.68
1927	1,821	455,807	251	.69
1928	1,789	500,019	280	.77
1929	1,800	490,142	272	.75
1930	1,819	476,964	262	.73
1931	1,764	420,333	238	.65

TABLE 5
WELLS AND CRUDE OIL PRODUCTION IN WASHINGTON COUNTY - Continued

Year	Total Wells Producing	Total Annual ¹ Production (bbls.)	Av. Annual Prod. per well (bbls.)	Av. Daily Prod. per well (bbls.)
1932	1,758	380,249	217	.59
1933	1,746	416,709	238	.65
1934	1,755	507,681	288	.79
1935	1,734	479,888	277	.76
1936	1,729	455,652	261	.72
1937	1,699	462,580	273	.75
1938	1,670	432,978	259	.71
1939	1,656	412,947	251	.69
1940	1,622	392,219	241	.66
1941	1,578	366,460	232	.64
1942	1,494	335,078	224	.62
1943	1,469	306,296	208	.57
1944	1,460	283,434	194	.53
1945	1,453	269,005	178	.49
1946	1,451	296,990	205	.56
1947	1,422	293,266	206	.56
1948	1,264	270,141	214	.59
1949	1,217	239,423	197	.54
1950	1,216	221,366	182	.50
1951	1,168	218,572	187	.51
1952	1,127	212,773	189	.52
1953	1,085	216,502	200	.55
1954	1,029	210,514	205	.56
1955	933	187,092	201	.55
1956	927	192,584	208	.57
1957	903	185,538	205	.56
1958	887	180,261	203	.56
1959	861	180,160	209	.57
1960	864	177,686	206	.56
1961	837	171,271	205	.56
1962	835	161,505	193	.53
1963	831	156,872	189	.52
1964	827	154,991	187	.51
1965	800	159,519	199	.55
1966	729	148,180	203	.56
1967	731	145,512	199	.55
1968	730	135,723	186	.51
1969	725	126,839	175	.48
1970	675	110,421	164	.45
1971	586	121,403	207	.57
1972	545	112,024	206	.56
1973	583	109,920	189	.52
1974	583	105,042	180	.49

1. In 1886 and 1887, the production includes Greene and Washington Counties. From 1889 to 1906 the production represents Washington County with the exception of the McDonald pool which is included in Allegheny County.

TABLE 6
WELLS AND CRUDE OIL PRODUCTION IN WESTMORELAND COUNTY

Year	Total Wells Producing	Total Annual Production (bbls.)	Av. Annual Prod. per well (bbls.)	Av. Daily Prod. per well (bbls.)
1921	1	150	150	.41
1922	1	233	233	.64
1923	1	215	215	.59
1924	1	257	257	.70
1925	1	186	186	.51
1931		374*		
1932		172		
1933		302		
1934		202		
1935		165		
1936		104		
1937		78		
1938		87		
1940		41		

* The production from 1931 to 1940 inclusive was pumped from gas wells.

TABLE 7

ESTIMATED ANNUAL PRODUCTION OF CRUDE OIL IN BARRELS,
AS SHOWN BY DECLINE CURVE, FOR 1975 THROUGH 2000

Year	Allegheny County	Armstrong County	Beaver County	Butler County	Washington County	Total
1975	58,000	8,800	4,500	74,000	100,000	245,300
1976	54,000	8,500	4,200	70,000	97,000	233,700
1977	51,000	8,300	3,900	65,000	93,000	221,200
1978	48,000	8,100	3,700	61,000	90,000	210,800
1979	45,000	7,900	3,400	57,000	86,000	199,300
1980	43,000	7,700	3,200	54,000	83,000	190,900
1981	40,000	7,500	3,000	51,000	80,000	181,500
1982	38,000	7,300	2,800	48,000	77,000	173,100
1983	35,000	7,100	2,700	45,000	74,000	163,800
1984	33,000	7,000	2,500	42,000	72,000	156,500
1985	31,000	6,800	2,300	40,000	69,000	149,100
1986	30,000	6,600	2,200	38,000	66,000	142,800
1987	28,000	6,400	2,100	35,000	64,000	135,500
1988	26,000	6,300	1,900	33,000	62,000	129,200
1989	25,000	6,100	1,800	31,000	59,000	122,900
1990	23,000	6,000	1,700	29,000	57,000	116,700
1991	22,000	5,800	1,600	28,000	55,000	112,400
1992	21,000	5,700	1,500	26,000	53,000	107,200
1993	20,000	5,500	1,400	25,000	50,000	101,900
1994	18,000	5,400	1,300	23,000	48,000	95,700
1995	17,000	5,300	1,200	22,000	46,000	91,500
1996	16,000	5,100	1,200	20,000	45,000	87,300
1997	15,000	5,000	1,100	19,000	43,000	83,100
1998	14,000	4,900	1,000	18,000	42,000	79,900
1999	13,000	4,800	970	17,000	40,000	75,770
2000	13,000	4,700	900	16,000	39,000	73,600
TOTAL	777,000	168,600	58,070	987,000	1,690,000	3,680,670

APPENDIX B

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Aten FIELD NO. 29

LOCATION: Township Findlay and Moon

County Allegheny 7 1/2' Quadrangle Clinton and Oakdale

DISCOVERY DATE & WELL 1896, W. Charlton #1, IP-75 barrels daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	206		
Total	206		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1800	35	8	7-5/8	200
				5-5/8	1000

PRODUCING WELLS None ABANDONED WELLS About 8

WELL SPACING Average 600' between wells

SAND CHARACTERISTICS - The Hundred Foot sand is very lenticular. It is a white, coarse-grained sandstone with pebbles up to .2 inch in length.

OPERATIONS - Secondary recovery operations were never tried in this field.

REMARKS - Wells in this field were pumped by individual gas engine units. Initial productions were as high as 75 barrels of oil per day in the early days. The wells produced some water which was found below the oil pay. This field was abandoned about 1910. The new Greater Pittsburgh International Airport is built at the site of this field. There is no known fresh-water flooding of the sand.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Shaw, E. W., and Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 177; data from former operator in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Bakerstown FIELD NO. 8
 LOCATION: Township Richland, West Deer (Middlesex and Clinton)
 County Allegheny (Butler) 7 1/2' Quadrangle Curtisville, Valencia
 DISCOVERY DATE & WELL 1888, Gold #1

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Third	5128		
Total	5128		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Third	1800	25	7	10, 8-1/4, 6-5/8	250 900 1500

PRODUCING WELLS 10 ABANDONED WELLS 650
 WELL SPACING About 400' between wells

SAND CHARACTERISTICS - The Third sand is usually hard and fine grained with the pay streak not much softer than the main sand body. In places the Third sand is medium coarse grained with soft pay streaks. The sand in this area is sometimes separated by a shale break, and when that occurs the upper part is called the Third and the lower part is called the Fourth. Occasionally two pay zones are encountered in this sand.

OPERATIONS - A small-scale gas drive project was operated in this field for about 15 years. Some of the producing wells tripped their production due to the gas drive. This project was economically operated. Secondary recovery in this field looks promising except that the oil wells have been abandoned and the new wells would have to be drilled or old wells reconditioned.

REMARKS - The wells were pumped by jacks and central power as well as individual units. The southern part of this field has been watered out from poorly plugged wells. The Hundred Foot sand in this area contains a large amount of water. Initial productions of the early wells were as high as 1,000 barrels per day.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Richardson, G. B., 1932, U. S. Geol. Survey. Bull. 829. Data from area operators.

• ALLEGHENY COUNTY, PENNSYLVANIA

Bellevue-Avalon

FIELD NAME (includes Hammerschmit & West View fields) FIELD NO. 21

LOCATION: Township Kilbuck, Ohio, Ross, and Shaler

County Allegheny 7 1/2' Quadrangle Emsworth, Glenshaw and

Pittsburgh West

DISCOVERY DATE & WELL Bellevue-1888, Harvey #1, IP-700 barrels daily; Hammerschmit #1, IP-3 bbls.; West View, Ivory #1, IP-190 bbls.

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	96	Gordon	357
Upper Nineveh	241	Fourth	1260
Total			1954

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1700	90	10	8-1/4, 6-5/8	0 thru Big Li
U. Nineveh	1800	25	10		1610
Gordon	2000	12	5		
Fourth	2000	15	10		

PRODUCING WELLS None ABANDONED WELLS About 75

WELL SPACING About 375' between wells

SAND CHARACTERISTICS - The Hundred Foot sand has a hard cap rock on top. The pay is a good, coarse, sugar sand. The first pay, if encountered, is about 33 feet in the sand and about 2 feet thick. This pay does not contain water. The second pay is about 63 feet in the sand and about 10 feet thick. This pay contains salt water. The Upper Nineveh sand is usually grayish white, hard, fine grained, with coarse, commonly pebbly pay zones. The Gordon sand usually has a cap rock on top with a bed of pebbles immediately beneath. The pay sand is white and fine grained and lies beneath the pebble zone. The Fourth is a fine- to medium-grained sandstone with a pebbly pay.

OPERATIONS - Secondary recovery projects have never been tried in this field.

REMARKS - The wells were pumped with individual gas engine units. Initial productions up to 40 barrels per day per well were encountered in the Hammerschmit field. Nine oil wells were drilled in this field. The water to oil ratio was 6 to 1. The number of wells drilled in the other fields are as follows: Bellevue 30, Avalon 20, and West View 16. All of these fields have been watered out with fresh or salt water. The Murrys ville sand above the Hundred Foot sand, in this area, contains large amounts of salt water.

REFERENCE - Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 176; Shaw, E. W., and Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 177; data from former operators of the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Brush Creek (includes Wexford) FIELD NO. 1
 LOCATION: Township Marshall, Pine (Cranberry and Adams)
 County Allegheny (Butler) 7 1/2' Quadrangle Emsworth, Mars
 DISCOVERY DATE & WELL Brush Creek - 1888, Warren well; Wexford - 1894

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	3825	Snee	92
Thirty Foot	92	Gordon	46
Total			4055

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1600	100	10	6-1/4, 5	800, 1500
Snee	1800	15	4		

PRODUCING WELLS 5 ABANDONED WELLS 400
 WELL SPACING About 500' between wells

SAND CHARACTERISTICS - The Hundred Foot sand consists of a close hard medium-grained sandstone with a shale break from 1 to 20 feet thick near the center of the formation. Within this sandstone occur lentils of a softer, more porous conglomeratic sandstone, which range in thickness up to 20 feet or more. The pay sand is found at different places in the formation. The first one occurs about 5 feet, the second one about 25 feet, one at 45 feet, and one at 65 feet in the formation. Thirty Foot, Snee and Gordon sands are occasionally productive. Only a single pay streak occurs in the Hundred Foot sand of the Wexford field at about 25 feet below the top.

OPERATIONS - Secondary recovery operations have never been tried in this field. Some sections of this field might be flooded with water but generally speaking the sand has not been flooded.

REMARKS - The wells are pumped with individual gas engine units. The initial productions of the early wells were as high as 200 barrels per day. The early wells had an oil to water ratio of 1 to 1. Now the oil to water ratio is about 1 to 40. The wells average about 1/2 barrel of oil per day.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 176; data from present operators in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Chartiers FIELD NO. 35
LOCATION: Township Chartiers and Greentree
County Allegheny 7 1/2' Quadrangle Pittsburgh West
DISCOVERY DATE & WELL 1890, John Arbuckle #1, IP-5000 barrels daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Gordon	529		

Total	529
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Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Gordon	1700	32	9	8-1/4, 6-1/4, 4-7/8	250, 800, 1600

PRODUCING WELLS None ABANDONED WELLS 100

WELL SPACING About 600' average between wells

SAND CHARACTERISTICS - The Gordon sand is a yellowish-colored sand. The first 13 feet of sand is fine and hard. Then comes 2 feet of coarse pay with pebbles up to 3/10 inch in length. Next is a 3-foot layer of hard siltstone followed by 7 feet of good, coarse, pebble pay sand. Below this the sand is hard and fine.

OPERATIONS - Secondary recovery operations have not been tried in this field. When the Hundred Foot sand contained water, a string of 4-1/4-inch casing was used.

REMARKS - This field is entirely inactive. The Beck well had an initial production of 3600 barrels a day. Originally the Gordon did not contain water. Initial productions of second crop wells were as high as 8 barrels per day. This field has been watered out from poorly plugged wells. The water pumped by the wells never got very fresh, but the wells increased in water production until they would produce about 6 barrels of water a day and no oil. The wells would continue to drizzle water if they were pumped after pumping their heads. The field would have to be dewatered before recovering any oil.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); data from former operator in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Coraopolis - Moon (includes Haysville) FIELD NO. 26
LOCATION: Township Moon, Findlay and Sewickley Heights
County Allegheny 7 1/2' Quadrangle Aliquippa, Ambridge and
Oakdale
DISCOVERY DATE & WELL 1890, J. Goss #3

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Gordon	1809		
Total	1809		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Gordon	1700 to 2100	12	5	7-5/8, 5-5/8, 4-1/4	200, 1000, 1800

PRODUCING WELLS 3 ABANDONED WELLS 170
WELL SPACING About 450' between wells

SAND CHARACTERISTICS - The Gordon sand consists of about 1-1/2 feet of bluish-gray, hard rock on top and immediately below this occurs pebbles up to 1/2 inch long. The pay part of the sand occurs just under this pebbly streak or in the bottom of the sand. The pay sand is white and fine. The sand runs in streaks in this field.

OPERATIONS - Secondary recovery operations have not been tried in this field. At the northern end of the field a small natural water drive has been operating. One well was flooded out and the well next to it increased in production from 40 to 120 barrels of oil per month.

REMARKS - The wells are pumped with individual gas engine units. A well on the O. A. Doughty had an initial production of 300 barrels per day of oil in the early days. The 4-1/4-inch casing is only run when water is encountered in the Hundred Foot sand. Some of the wells got small and were abandoned while others slowly decreased in oil and increased in salt water. There is spotty Hundred Foot sand production in this field with the well producing a great deal of water.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 176; data from present operators in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Dorseyville (Deer Creek) FIELD NO. 17

LOCATION: Township Indiana, Hampton, and Harmar

County Allegheny 7 1/2' Quadrangle Glenshaw and New Kensington

DISCOVERY DATE & WELL 1900

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Thirty Foot	1198		
Total	1198		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Thirty Ft.	1930	45	8	8-1/4, 6-5/8, 5-3/16	500, 1000, 1800

PRODUCING WELLS Unknown

ABANDONED WELLS Unknown

WELL SPACING About 500' between wells

SAND CHARACTERISTICS - The Thirty Foot sand usually contains two pay streaks. The pay streaks are reported as good, soft sand ranging in texture from fine grained to pebbly. Those parts of the Thirty Foot sand that do not contain oil are reported as hard and tight. The pay streaks are not persistent but occur irregularly. Usually the upper part of the sand is barren. The pay streaks average between 3 and 5 feet in thickness.

OPERATIONS - One air drive project was tried but was unsuccessful. The Thirty Foot sand would not take the air at pressures up to 350 p.s.i.

REMARKS - The wells are pumped with individual gas engines. Some oil is found in the Hundred Foot but the production is very spotty. The initial productions of wells in the Thirty Foot sand were as high as 1,140 barrels a day with an average of 100 barrels per day. Very little or no water is found in the Thirty Foot sand.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Richardson, G. B., 1932, U. S. Geol. Survey, Bull. 829; data from present operators in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Duff City (includes Zimer field) FIELD NO. 2
 LOCATION: Township Economy, Franklin and Marshall
 County Allegheny 7 1/2' Quadrangle Ambridge, Baden, and
Emsworth
 DISCOVERY DATE & WELL 1890, Duff #1

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Thirty Foot	220		
Snee	1030		
Total	1250		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Thirty Ft.	1450 to 1850	30	12	8-1/4, 6-1/4	300, 800, 1500
Snee	1500 to 1900	15	10	4-7/8	

PRODUCING WELLS Unknown ABANDONED WELLS 500
 WELL SPACING 400' to 500' between wells

SAND CHARACTERISTICS - The Thirty Foot sand is a dark-gray, fine-grained, broken sandstone. The producing areas are spotted. The Snee sand is a bluish-gray, fine-to coarse-grained sandstone with a soft porous pay zone with pebbles up to 3/10 inch in length.

OPERATIONS - A gas drive project was tried on the Thirty Foot but the project was not successful. The sand took only a small amount of gas at very high pressures and no increase in production was noted. The Thirty Foot will not take water; an accidental water flood occurred in a couple of areas of the Snee sand, and wells have increased from 1/2 to 3 barrels per day. Vacuum will work on the Hundred Foot sand, but not on the Thirty Foot or Snee.

REMARKS - The wells are pumped with individual gas engine units. The Hundred Foot production is very spotty. The Zimer field is completely abandoned and is flooded with fresh and salt water. Oil in the Zimer field was found in the top of the Snee sand which is about 15 feet thick. Spotty oil production is also found in the Boulder sand. A well producing from this sand had an initial production of 400 barrels a day.

REFERENCE -Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 176; data from present operators in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Ewings Mill FIELD NO. 33

LOCATION: Township Robinson and Moon

County Allegheny 7 1/2' Quadrangle Oakdale and Pittsburgh West

DISCOVERY DATE & WELL 1892, Young #1, IP-3500 barrels daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	619		
Total	619		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1750	28	9	8-1/4	200
				6-1/4	1000

PRODUCING WELLS None ABANDONED WELLS 35

WELL SPACING About 600' between wells

SAND CHARACTERISTICS - The Hundred Foot sand is productive of oil only in the upper part of the sand or the section known as the Gantz sand. The upper 16 feet of the Gantz sand is a white, fine, hard sand. Under this occurs about 9 feet of pay sand which is a white, coarse sand full of pebbles as long as 4/5 inch. Under this pay the sand hardens and runs into about 11 feet of shale. Then comes about 70 feet of sand known as the Fifty Foot, which in this area contains only salt water.

OPERATIONS - Secondary recovery projects have never been tried in this field. In later years wells were drilled through the break into the Fifty Foot sand which contains large amounts of salt water. This water came up the hole and flooded the Gantz sand. As the flood moved, the wells increased in gas production, then in oil, next increased in water and finally produced all water. This field is flooded with salt water.

REMARKS - The wells were pumped with individual gas engine units. Several of the early wells made up to 1500 barrels a day of oil. Originally there was no water in the Gantz sand.

REFERENCE - Data from former operators in this field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Glenfield - Mt. Nebo FIELD NO. 23

LOCATION: Township Aleppo, Sewickley Heights, and Ohio

County Allegheny 7 1/2' Quadrangle Ambridge and Emsworth

DISCOVERY DATE & WELL Glenfield-1895, John Wachter, IP-18 bbls. daily; Mt. Nebo-
1886, McCrea, IP-8 bbls.

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Boulder	206		
Gordon	156		
Fourth	1314		
Total	1676		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Boulder	1900	12	10	8-1/4	125
Gordon	2000	25	8	6-5/8	800
Fourth	2100	15	10	5-3/16	1750

PRODUCING WELLS Unknown ABANDONED WELLS 150

WELL SPACING About 400' between wells

SAND CHARACTERISTICS - The Boulder is a medium-grained sandstone. The Gordon sand consists of two streaks of pay from 1 to 4 feet thick and is a fine conglomerate of white quartz pebbles which range in size from coarse sand to well-worn pebbles as long as 3/10 inch. The Fourth sand is a fine- to medium-grained sandstone with a soft (sometimes pebbly) pay.

OPERATIONS - Secondary recovery has not been tried in this field.

REMARKS - The wells were pumped by individual gas engine units. The Gordon sand contains no water and initial productions of the wells were as much as 50 barrels per day. The Fourth sand contained little or no water at first but is now flooded with fresh water. Some initial productions were over 100 barrels per day. During accidental water flood, the production of some wells went from 1/2 to 5 barrels per day.

REFERENCE -Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 176; data from present operators in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Glenshaw FIELD NO. 20
 LOCATION: Township Fox Chapel, Hampton, Indiana, O'Hara, and Shaler
 County Allegheny 7 1/2' Quadrangle Glenshaw

DISCOVERY DATE & WELL 1888, Kessler #1, IP-about 50 barrels daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Thirty Foot	1343		
Total	1343		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Thirty Ft.	1750	35	3	8-1/4, 6-5/8, 5-3/16	150, 650, 1700

PRODUCING WELLS Unknown ABANDONED WELLS 200

WELL SPACING About 600' average between wells

SAND CHARACTERISTICS - The Thirty Foot sand is usually grayish white, hard, fine grained, with a coarse commonly pebbly, open pay sand. Some of the pebbles are 4/5 inch long. The wells with small production produce from a pay which is very tight. Generally only one pay is found but sometimes two pays are present. The first pay is 2 feet below the top of the sand and the second is 20 feet in the sand

OPERATIONS - No form of secondary recovery has ever been tried. The sand does not contain fresh water. This sand does not look very favorable for secondary recovery due to its spotted nature. There are specific areas where wells are producing from the same porous area where secondary recovery might work.

REMARKS - The wells are pumped with individual gas engine units. The largest initial production in the early life of the field was 50 barrels per day. Later wells ranged from 1 to 10 barrels a day. The production is very spotted in this field and each well seems to be producing from a separate porous bed in the sand. According to Sisler and others (1933), the field was discovered in 1880.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Richardson, G. B., 1932, U. S. Geol. Survey, Bull. 829; data from present operators in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Imperial FIELD NO. 31
LOCATION: Township North Fayette, Findlay and Moon
County Allegheny 7 1/2' Quadrangle Clinton and Oakdale
DISCOVERY DATE & WELL 1893, Johnston #1

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	294		
Lower Nineveh	1980		
Total	2274		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1800	35	9	8-1/4, 6-1/4	200, 1175
L. Nineveh	1925	12	8		

PRODUCING WELLS Unknown ABANDONED WELLS About 230
WELL SPACING 600' average well spacing

SAND CHARACTERISTICS - The Hundred Foot sand is very lenticular and spotted, with a variable sand composition. The Lower Nineveh consists of a white pebbly sand. The first 4 feet of sand is hard and pebbly with pebbles up to 1/2 inch in length. About 4 feet in, the pay is encountered. The pay contains pebbles and, in places, the best part of it is a fine muddy sand. The bottom of the sand is hard.

OPERATIONS - The Hundred Foot sand had vacuum on it in the early days. No other secondary recovery method has been tried.

REMARKS - The wells are pumped with individual gas engine units. Initial productions in the Hundred Foot sand were as high as 250 barrels a day of oil and some of the wells produced large quantities of water in the early days. The Lower Nineveh sand wells were as much as 30 barrels of oil per day in initial production in the early days and produced no water. In 1910 a new well had an initial production of about 4 barrels of oil a day but soon decreased to practically nothing. There has been no fresh-water flooding of this sand.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); data from present operators in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Ingomar - Grubbs FIELD NO. 3

LOCATION: Township Franklin, Park, McCandless and Pine

County Allegheny 7 1/2' Quadrangle Emsworth

DISCOVERY DATE & WELL Ingomar-1905, James Neely, IP-about 2 bbls. daily; Grubbs-18
Grubbs #1, IP-4800 bbls. daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	666		
Boulder	160		
Total	826		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1800	90	10	8-1/4	180
Boulder	1900	12	10	6-1/4	800
				4-7/8	1600

PRODUCING WELLS Unknown ABANDONED WELLS 75

WELL SPACING About 500' between wells

SAND CHARACTERISTICS - The Hundred Foot sand consists of a close, hard, medium-grained sandstone with a shale break, from 1 to 20 feet thick, near the center of the formation. From 1 to 3 pays are present consisting of soft, porous, conglomeratic sandstone. The Boulder sand in this field is a lense of open, porous sand which pinches out around the edges of the field into a closer, harder sandstone.

OPERATIONS - Vacuum, used in the Ingomar field, is the only secondary recovery operation used in this field. The use of vacuum increased the production of some wells from 1 to 5 barrels a day. These two fields have not been flooded with fresh water.

REMARKS - The wells are pumped with individual gas engine units. The wells in the Hundred Foot sand generally produced from 5 to 50 barrels of water to 1 of oil. The initial productions of early wells in this sand were as great as 180 barrels per day. The Boulder sand contains no water and early initial productions were rather high. The Hundred Foot wells pumped 24 hours a day to get rid of water.

REFERENCE -Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 176; data from present operators in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Leetsdale (includes Phillips & Sevins field) FIELD NO. 24
LOCATION: Township Crescent, Moon, Leet, Bell Acres (Hopewell)
County Allegheny (Beaver) 7 1/2' Quadrangle Ambridge
DISCOVERY DATE & WELL 1904

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	1171		
Total	1171		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1200 to 1600	40	12	8-1/4, 6-1/4	50 700

PRODUCING WELLS None ABANDONED WELLS 60
WELL SPACING From town lot to 400 feet

SAND CHARACTERISTICS - The Hundred Foot sand has 5 feet of cap rock on top which is very hard and bluish gray in color. This cap rock grades into a 4-foot layer of bluish, hard, fine-grained siltstone. Below this is about 12 feet of pay which is a white, coarse, conglomeratic sandstone with pebbles up to one inch in diameter. This pay grades into a white fine sandstone which gets darker in color down to the bottom of the sand.

OPERATIONS - Secondary recovery projects have never been tried in this field. The field has been flooded with fresh water from the river during flood stage. This field does not look favorable for secondary recovery operations.

REMARKS - The wells were pumped with individual gas engine units and some central power systems. The early wells had initial productions up to 50 barrels of oil per day per well. Some of the wells had to pump 24 hours a day to pump down the water. Others produced just a little water. The average water to oil ratio was about 2 to 1. These fields have all been flooded with fresh water.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 176; data from former operators in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Lickskillet - Hopper FIELD NO. 38
LOCATION: Township South Fayette and Upper St. Clair
County Allegheny 7 1/2' Quadrangle Bridgeville, Cannonsburg,
and Oakdale
DISCOVERY DATE & WELL 1895

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	1464		
Fourth	597		
Total	2061		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	2100	50	9	6-1/4	1250
Fourth	2300	18	10		

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
WELL SPACING About 500' between wells

SAND CHARACTERISTICS - The Hundred Foot sand is a quartzose, very fine to coarse-grained conglomeratic sandstone with a few interbedded shales. The Fourth sand is usually hard and fine grained.

OPERATIONS - A small repressuring operation was tried in the Lickskillet field, but no details are available.

REMARKS - The lower part of the Hundred Foot sand contains the oil and also some salt water. The Fourth appears to be free of salt water. Some Hundred Foot wells make 4 barrels of salt water per barrel of oil and others make 1/4 barrel of salt water per barrel of oil. No wells are known to be lost by fresh-water flooding. The wells were pumped by individual gas engine.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Shaw, E. W., and Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 177; data from present operators in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME McCormick FIELD NO. 30
LOCATION: Township Moon
County Allegheny 7 1/2' Quadrangle Oakdale
DISCOVERY DATE & WELL 1890's

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	163		
Fourth	142		
Total	305		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1775	50	9	8-1/4, 6-1/4,	155, 700,
Fourth	2000	13	7	4-7/8	1500

PRODUCING WELLS Unknown ABANDONED WELLS 15
WELL SPACING 600' average
SAND CHARACTERISTICS - The Hundred Foot sand is very lenticular with a variable sand composition. The Fourth sand is usually fine grained and hard.

OPERATIONS - Secondary recovery operations have not been tried in this area.

REMARKS - Some salt water is found in the Hundred Foot. There is no known fresh-water flooding of wells. The wells were all pumped by individual gas engines.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); data from present operators in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME McDonald* - McCurdy** FIELD NO. 32
 LOCATION: Township Collier, N. Fayette, S. Fayette, Robinson (Cecil, Mt. Pleasant,
County Allegheny (Washington) 7 1/2' Quadrangle Cannonsburg, & Robinson)
Clinton, Midway, and Oakdale
 DISCOVERY DATE & WELL *E. McDonald #1, 1890, IP-12 BOPD; **McCurdy #1, 10/5/1890,
IP-600 BOPD

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	73	Gordon	9,061
Fifty Foot	114	Fifth	12,003
Gordon Stray	129		
Total			21,380

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1926	95	5	10, 8-1/4	150, 1125
Fifty Foot	1960	45	5		
Gordon Stray	2163	13	5	6-5/8, 5-3/16	1330, 2100
Gordon	2186	25	7		
Fifth	2306	22	7		

PRODUCING WELLS	About 240	ABANDONED WELLS	About 1400
WELL SPACING	About 600 feet		

SAND CHARACTERISTICS - The Hundred Foot and Gantz sands are light gray, dominantly quartzose, very fine grained to irregularly conglomeratic and contain occasional interbedded shales. The Gordon Stray sand is light to dark gray, quartzose, fine to medium grained, and often contains shale or sandy shale beds. Oil production is generally encountered 7 feet from the top of the sand. The Gordon sand is light gray to white, highly quartzose, fine grained to conglomeratic and occasionally contains interbedded shale. Quartz pebbles are up to an inch in the longest dimension. The pay section of the sand is found about 5 feet below the top. The areal extent of the Gordon sand in Allegheny County is 3985 acres and 5076 acres in Washington County. The Fifth sand is light gray to white, highly quartzose, fine grained to conglomeratic, with occasional shale intercalations. Not uncommon are cobbles up to 1-3/4 in in the longest dimension. The pay section of the sand is found approximately 5 feet from the top of the sand below a tight cap rock. The areal extent of the Fifth sand in Allegheny County is 8532 acres and 3471 acres in Washington County.

OPERATIONS - A large area in this field has been under gas repressuring applied to the Gordon sand and oil recovery by this method has been as much as 184 barrels per acre foot on one particular lease. Natural water flooding in some areas has greatly increased the production from both the Gordon and the Fifth sands. A Fifth sand area is also under gas repressuring. Production in the McCurdy field is chiefly Fifth sand.

REMARKS - The Hundred Foot sand may have 2 pay zones, the Gordon 2 and the Fifth may have several. The Hundred Foot frequently contains salt water. The Gordon Stray is devoid of salt water. The Gordon has some in the southeastern and eastern part of the field and the Fifth contains very little. Most of the production of oil comes from the Fifth and Gordon sands. Initial productions were as high as 14,000 barrels per day. The wells are pumped by individual gas engines. The well with the largest initial production in Pennsylvania is still producing in this field after 84 years of continuous production. The well has produced over one million barrels.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Ingham, A. I. and others, 1949, Pa. Geol. Survey, 4th ser., Min. Resource Rept. 29; data from present operators in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Millerstown FIELD NO. 10
LOCATION: Township Fawn, Frazer, West Deer (Buffalo, Clinton)
County Allegheny (Butler) 7 1/2' Quadrangle Curtisville, New Kensington
DISCOVERY DATE & WELL 1925, Jim Elliott #1, IP-about 5 barrels daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Fifth	437		
Total	437		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Fifth	2100	16	5	10, 8-1/4, 6-1/4	250, 900, 1500

PRODUCING WELLS Unknown ABANDONED WELLS 14
WELL SPACING About 400' between wells

SAND CHARACTERISTICS - The Fifth sand consists of a white to gray, fine-grained, well-cemented hard sandstone with open pebbly pays. Sometimes two pays are present. The first pay occurs at the top of the sand while the second pay occurs about 16 feet in the sand.

OPERATIONS - This field had vacuum on it, which increased the production about 30 percent. No other secondary recovery methods have been tried in this field. The sand has not been flooded with fresh or salt water.

REMARKS - The wells were pumped with individual gas engine units. The Fifth sand does not contain water. The largest initial production in the early life of the field was 800 barrels a day. One well flowed 200 barrels a day for 3 months, through the casing.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Richardson, G. B., 1932, U. S. Geol. Survey, Bull. 829; data from present operator in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Milltown FIELD NO. 16

LOCATION: Township Plum and Penn

County Allegheny 7 1/2' Quadrangle Braddock and New Kensington

DISCOVERY DATE & WELL Hundred Foot - 1894, Caldwell #1

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	2264		
Total	2264		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1900	110	6	8-1/4, 6-5/8, 4-7/8	500, 900, 1855

PRODUCING WELLS Unknown

ABANDONED WELLS 300

WELL SPACING About 400' between wells

SAND CHARACTERISTICS - The Hundred Foot sand is a white, medium- to coarse-grained sandstone, with a fairly high porosity. Commonly there are 2 pays which are described as nice pebble sand. Production is very spotted and where dry, the sand is hard and tight. The pays occur about 50 feet and 70 feet in the sand.

OPERATIONS - One gas drive project was tried and was unsuccessful, probably due to poor equipment. Vacuum was tried on one well, but no increase in production was seen. The production in this field is spotted, but a few areas probably would respond to air or gas drive.

REMARKS - The wells were pumped with individual gas engine units. Initial productions were up to 100 barrels, but averaged less than 20 barrels in the Hundred Foot sand. Variable amounts of water are usually present in the Hundred Foot sand. Water sometimes occurs above the oil pay, but generally the oil and water come together. Hundred Foot well produced 90 barrels of water to 1 barrel of oil.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Richardson, G. B., 1932, U. S. Geol. Survey, Bull 829.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Moon Run - Crafton FIELD NO. 34
 LOCATION: Township Chartiers, Collier, Kennedy, Robinson, Stowe
 County Allegheny 7 1/2' Quadrangle Pittsburgh West

DISCOVERY DATE & WELL November, 1888, Phelps #1

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	54	Fourth	386
Gordon Stray	87	Fifth	1286
Gordon	1620		
Total			3433

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1700	60	9	8-1/4,	900,
Gordon Stray	2000	25	7	6-5/8,	1150,
Gordon	2100	40	8	5-3/16	1950
Fourth	2200	25	12		
Fifth	2250	20	8		

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
 WELL SPACING 400 to 800 feet (average 600)

SAND CHARACTERISTICS - The Hundred Foot is a light-colored, fine-grained to coarse, pebbly, lenticular sandstone. The Gordon Stray is quartzose, fine to medium grained, and often contains shale beds. The Gordon is usually coarse grained with a soft pay streak. The Fourth sand is hard and fine grained. The Fifth is fine grained with usually a pebbly pay. Oil occurs in several pays in the Fourth and Fifth sands but is most persistent near the base of the Fourth.

OPERATIONS - A small gas repressuring set-up was tried just southwest of the southeastern end of Neville Island. It was somewhat crude and not very effective. The Fifth sand has been produced under vacuum in the past.

REMARKS - Initial productions at the beginning varied from 50 to 2,000 barrels per day, but recently drilled wells had initial productions less than 1 to 10 barrels. The Hundred Foot sand contains variable amounts of salt water which must be cased off. The other sands contain some. Pumping was done with individual gas engines.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Shaw, E. W., and Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 177; data from present operators in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Neville Island FIELD NO. 22
LOCATION: Township Neville Island, Robinson, Stowe
County Allegheny 7 1/2' Quadrangle Ambridge, Emsworth, and
Pittsburgh West
DISCOVERY DATE & WELL About 1900

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	1259		
Fourth	185		
Total	1444		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1700	60	9	8-1/4,	900,
				6-5/8,	1150,
				5-3/16	1950

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
WELL SPACING 600' average
SAND CHARACTERISTICS - The Hundred Foot is a light-colored, fine-to coarse-grained, pebbly, lenticular sandstone.

OPERATIONS - Secondary recovery has not been tried in this field. The sand in this field is harder and more in streaks than in Moon Run, so repressuring probably would not work as well, except on a small scale.

REMARKS - The initial productions of early wells varied from 50 to 2000 barrels per day but recently drilled wells had initial productions of from 2 to 10 barrels per day. The Hundred Foot sand contains some salt water. No wells are known to be flooded out by fresh water.

REFERENCE - Data from present operators in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME New Texas FIELD NO. 46
LOCATION: Township Plum
County Allegheny 7 1/2' Quadrangle Murrysville
DISCOVERY DATE & WELL 1912 - Hundred Foot; 1917 - Speechley Stray

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	463		
Speechley Stray	260		
Total	723		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Foot	2000	70	10	10, 8-1/4,	100, 930
Speechley Stray	3160	20	10	6-5/8	2100

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
WELL SPACING 600 feet

SAND CHARACTERISTICS - The Hundred Foot sand is a fine-to coarse-grained sandstone and white to dark in color. The Speechley Stray sand is chocolate colored, medium grained and of medium hardness.

OPERATIONS - Secondary recovery operations have never been tried in this field.

REMARKS - The Hundred Foot pool was revived in 1922 when a well came in at 1400 barrels a day, but its life was short. The life of a Hundred Foot well is about 15 years. The largest initial production of the Speechley wells was 30 barrels a day of oil.

REFERENCE - Johnson, Meredith E., 1926, Pa. Geol. Survey, 4th ser., Atlas 37; data from operators in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Rennerdale FIELD NO. 36
 LOCATION: Township Collier and South Franklin
 County Allegheny 7 1/2' Quadrangle Oakdale
 DISCOVERY DATE & WELL Unknown

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	274		
Total	274		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1850	75	10	10, 8-1/4, 5-3/16	50, 700, 1400

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
 WELL SPACING 500 feet

SAND CHARACTERISTICS - The Hundred Foot sand is a light-gray, quartzose, fine-to coarse-grained sandstone, conglomeratic in places. It contains a few interbedded shale beds.

OPERATIONS - Secondary recovery operations have not been tried.

REMARKS - The wells were pumped with individual gas engines.

REFERENCE - Shaw, E. W., and Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 17

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Rural Ridge FIELD NO. 9

LOCATION: Township East Deer, Indiana, and Harmar

County Allegheny 7 1/2' Quadrangle New Kensington

DISCOVERY DATE & WELL Thirty Foot-1913; Fifth-11/9/18, IP-300 barrels daily

FIELD DATA

Producing Sands		Acres	Producing Sands		Acres
Thirty Foot		1243			
Fifth		300			
Total		1543			
Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Thirty Ft.	1500 to 1800	20	5	8-1/4,	160,
Fifth	2000	20	6	6-5/8,	700,
				5-3/16	1700

PRODUCING WELLS Unknown ABANDONED WELLS Unknown

WELL SPACING About 600'

SAND CHARACTERISTICS - The Thirty Foot sand is a light, gray to white, sugar, pebble sand where productive and hard and close where unproductive. The Fifth sand is a gray, fine-grained sandstone with a soft, pebble pay.

OPERATIONS - Secondary recovery operations have never been tried in this field.

REMARKS - The wells were pumped with individual gas engine units. The Fifth sand production is rather spotty. The initial productions in the Fifth sand were as high as 300 barrels daily. The initial productions of wells in the Thirty Foot sand were small. The water to oil ratio in this sand is about 1 to 3.

REFERENCE - Richardson, G. B., 1932, U. S. Geol. Survey, Bull. 829; data from present operators in the field.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Sandle-Wildwood (includes Evergreen field) FIELD NO. 6
 LOCATION: Township Franklin, Hampton, McCandless, Shaler, and West Deer
 County Allegheny 7 1/2' Quadrangle New Kensington and Sewickley

DISCOVERY DATE & WELL Wildwood-1889, Austin Heirs, IP-1300 barrels daily
Evergreen-1889

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	(see below)		
Third	3207		
Total	3207		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length o casing (ft.)
Hundred Ft.	1550	110	5	8-1/4, 6-5/8,	250, 700,
Third	1850	20	10	5-3/16	1525

PRODUCING WELLS Unknown ABANDONED WELLS 350
 WELL SPACING About 500' between wells

SAND CHARACTERISTICS - The Hundred Foot sand, whose production is spotted, consists of a hard, fine-to coarse-grained sandstone with softer pay zones where productive. The Third sand is a hard, tight, fine-to coarse-grained sand with a loose, coarse-grained to pebble pay. A large percentage of the wells have two pays.

OPERATIONS - Secondary recovery projects have not been tried in this area. Well abandonments are so scattered that any form of secondary operation is impossible without some redrilling.

REMARKS - The wells were pumped with individual gas engine units. Initial productions were very high in the Third sand. Wells of 2,000 to 3,000 barrels when first drilled were common. The average was several hundred barrels. The Third sand wells were later plugged and produced from the Hundred Foot sand in the northeastern part of the field. The Hundred Foot wells averaged about 10 barrels per day initial production and were as high as 50 barrels per day. This sand carries variable amounts of water. No water is found in the Third sand.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 176; Richardson, G. B., 1932, U. S. Geol. Survey, Bull. 829.

ALLEGHENY COUNTY, PENNSYLVANIA

FIELD NAME Woodville FIELD NO. 37
LOCATION: Township Scott and Collier
County Allegheny 7 1/2' Quadrangle Pittsburgh West
DISCOVERY DATE & WELL 1892, John Schmitt #1

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Upper Nineveh	44		
Lower Nineveh	207		
Total	251		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
U. Nineveh	2050	35	6	10,	150,
L. Nineveh			10	8,	1100,
				6	1250

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
WELL SPACING 350 feet

SAND CHARACTERISTICS - The Nineveh (Thirty Foot) sandstones are hard, fine to coarse grained, and reddish in color. Generally only one pay is present and it ranges from 9 to 25 feet below the top of the sand. This pay is coarse with white quartz pebbles which range from 1/10 to 4/5 inch in length. Occasionally there is a 5-foot gas pay about 4 feet below the top of the sand.

OPERATIONS - Secondary recovery operations have not been tried in this field.

REMARKS - The initial production of the first well was about 100 barrels per day, but more recent wells made 3 to 5 barrels the first day. The well produced very little salt water. No fresh-water flooding is known to exist. The wells are pumped by individual gas engines.

REFERENCE - Shaw, E. W., and Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 177; data from present operators in the field.

ARMSTRONG COUNTY, PENNSYLVANIA

FIELD NAME Rattlesnake FIELD NO. 59

LOCATION: Township Perry

County Armstrong 7 1/2' Quadrangle Parker

DISCOVERY DATE & WELL About 1887

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	248		
Total	248		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	675	60	8	6-1/4	400

PRODUCING WELLS Unknown ABANDONED WELLS Unknown

WELL SPACING 400 feet

SAND CHARACTERISTICS - The Hundred Foot sand is a dark shaly sandstone for the first 16 feet, the sand becoming whiter for the next 15 feet, and then 5 feet or more of coarse pay sand. The sand becomes harder toward the bottom with the last few feet becoming a brown to reddish coarse sand.

OPERATIONS - No secondary recovery operations have ever been tried in the field.

REMARKS - Initial productions varied up to 25 barrels of black oil a day. The wells are pumped with a central power and pumping jacks or individual pumping units. Some salt water is produced with the oil.

REFERENCE - Bergsten, J.M.L., and Heeren, L.A., 1961, Pa. Geol. Survey, 4th ser., Special Bull. 9; Shaw, E.W., and Munn, M.J., 1911b, U.S. Geol. Survey, Bull. 454; Shaw, E.W., Lines, E.F., and Munn, M.J., 1911, U.S. Geol. Survey, Geol. Atlas 178; operators in field.

BEAVER COUNTY, PENNSYLVANIA

FIELD NAME Brenner FIELD NO. 111
LOCATION: Township New Sewickley
County Beaver 7 1/2' Quadrangle Baden
DISCOVERY DATE & WELL 1895, Hill Brenner #1, IP-75 barrels daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	363		
Total	363		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1300	60	10	8-1/4, 6-1/4, 5	21, 525, 1275

PRODUCING WELLS Unknown ABANDONED WELLS About 75
WELL SPACING About 500' between wells

SAND CHARACTERISTICS - The Hundred Foot sandstone is a hard, medium-grained sandstone, with a shale break 1 to 20 feet in thickness near the center. Within this sandstone occur lentils of a softer, more porous conglomeratic sandstone. The first couple of feet is hard. The next 10 feet is a softer, sugar pay sand. Under the pay, the sand is hard until near bottom when it becomes broken and shaly.

OPERATIONS - Secondary recovery operations have never been tried in this field. The sand is not flooded with fresh water.

REMARKS - The oil pay is found at the top of the sand. Salt water is pumped with the oil. The wells were not very large but produced enough to be profitable. Production is spotted in this field. As many as three pay zones are found in some single wells. The ratio of water to oil varies from 1:1 to 1:4. The largest initial production was over 100 barrels per day and the average from 15 to 20 barrels per day.

REFERENCE - Munn, M. J., 1911a, U.S. Geol. Survey, Geol. Atlas 176; data from former operator in the field; unpublished data from the files of the Pa. Geol. Survey.

BEAVER COUNTY, PENNSYLVANIA

FIELD NAME Carson FIELD NO. 117
 LOCATION: Township Greene
 County Beaver 7 1/2' Quadrangle East Liverpool South
 DISCOVERY DATE & WELL 1901, Sam Carson #1, IP-5 barrels daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Berea	237		
Total	237		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Berea	1300	25	10	6-1/4	1000

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
 WELL SPACING About 400' between wells

SAND CHARACTERISTICS - The Berea sand is a gray to white, fine-to coarse-grained sandstone. Some pebbles are 1/2 inch in length. Generally, there is about 8 feet of good sand, a 5-foot break of poor sand and then about 4 feet more of good sand.

OPERATIONS - An air-gas drive project is in operation in this field. It was started in 1936 when the average daily production per well was 1 barrel per day. The production was doubled due to the air-gas drive.

REMARKS - The wells are pumped with jacks and central powers. The initial productions of the early wells were as high as 100 barrels per day. They varied from 5 to 100 barrels a day per well. The wells produced some water. The water to oil ratio varied from 1:1 to 3:1.

REFERENCE - Data from present operators in the field.

BEAVER COUNTY, PENNSYLVANIA

FIELD NAME College Hill - Beaver Falls FIELD NO. 108
LOCATION: Township North Sewickley
County Beaver 7 1/2' Quadrangle Beaver Falls
DISCOVERY DATE & WELL Unknown

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Berea	119		
Total	119		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Berea	700	35	10	6-1/4	400

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
WELL SPACING About 400' between wells

SAND CHARACTERISTICS - The Berea sand is a light-gray to white, quartzose sandstone of fine, even texture though locally reported pebbly. The pay streaks commonly occur at about 20 feet in the sand.

OPERATIONS - No secondary recovery methods have been tried.

REMARKS - No additional information is available on this field.

REFERENCE - Anonymous, report in file of Pennsylvania Geological Survey.

BEAVER COUNTY, PENNSYLVANIA

FIELD NAME Cookson FIELD NO. 122

LOCATION: Township Economy

County Beaver 7 1/2' Quadrangle Baden

DISCOVERY DATE & WELL 1890, Cookson #1, Initial Production - 5 barrels daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	264		
Total	264		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1200 to 1600	80 below break	8	8-1/4, 6-1/4	250 650

PRODUCING WELLS None ABANDONED WELLS 30

WELL SPACING About 400' between wells

SAND CHARACTERISTICS - The Hundred Foot sand is generally gray or white above the parting and white, blue, or dark below it. The sand is, as a rule, of medium texture, but in its mass occur thin, irregular lenses of coarse conglomeratic sand composed largely of pebbles of white or yellow quartz.

OPERATIONS - Vacuum was on the sand from 1904 to 1945. This increased the production tenfold in open sand wells. The sand is not flooded with fresh water. Air or gas drive has never been tried.

REMARKS - The wells were pumped by individual gas engine units. The largest produced 200 barrels per day while the average was 25 to 30 barrels. Wells in this field produced very little salt water at first. In later years, the wells increased their production of salt water until no oil was produced, and the wells produced about 3 barrels of water per day. The big excitement started in 1898. According to Sisler and others (1933), this field was discovered in 1877.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 176; data from present operators in the field.

BEAVER COUNTY, PENNSYLVANIA

FIELD NAME Crows Run (includes Dunn field) FIELD NO. 112

LOCATION: Township Economy, New Sewickley (Marshall)

County Beaver (Allegheny) 7 1/2' Quadrangle Baden

DISCOVERY DATE & WELL July 1900, Wallace #2, IP-1500 barrels daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	2000		
Total	2000		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1300 to 1800	80	15	6-1/4, 5	500 1400

PRODUCING WELLS Unknown ABANDONED WELLS 230

WELL SPACING About 300' between wells

SAND CHARACTERISTICS - The Hundred Foot is a fine-grained to pebbly sandstone with a shale break on top. The pay is usually pebbly or very coarse sand. Pebbles range from 3/10 to 2 inches in length. Commonly there are two pays. The upper pay in the top of the sand is about 8 feet thick, and the lower pay about 20 feet in the sand is about 7 feet thick. The second pay is below the break.

OPERATIONS - Vacuum was used for some time and increased the production a little. Air or gas drive has never been tried in this field. For an intense air-gas drive to operate in this field, new wells would have to be drilled and the sand dewatered. It is doubtful if the increased production from the drive would offset the cost of drilling and dewatering.

REMARKS - The wells are pumped with individual gas pumping units. The connate water in the producing sand varies from dry to a greater water production than oil. Water is generally found below the pay zone. Water has flooded two thirds of the field from the northern end toward the south. The best wells yielded from 300 to 500 barrels of oil per day. The report includes the Dunn field.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Munn, M.J., 1911a, U. S. Geol. Survey, Geol. Atlas 176; data from present operators in the field.

BEAVER COUNTY, PENNSYLVANIA

Economy-Legionville

FIELD NAME (includes Craig & David fields) FIELD NO. 121

LOCATION: Township Bell Acres, Economy, and Harmony

County Beaver (Allegheny) 7 1/2' Quadrangle Ambridge

DISCOVERY DATE & WELL 1885, Ludwig well

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	897		
Boulder	35		
Total	932		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1300 to 1700	25	6	8-1/4,	250,
Boulder	1500 to 1900	10	8	6-5/8	700

PRODUCING WELLS Unknown ABANDONED WELLS 160

WELL SPACING 500' between wells

SAND CHARACTERISTICS - The Hundred Foot sand is generally gray or white, medium grained, but in the bed occur thin, irregular lenses of coarse conglomeratic sand composed largely of pebbles of white or yellow quartz. The Boulder sand is a fine-grained sandstone.

OPERATIONS - This field was under vacuum for a few years, and it increased the production about 15 percent. Repressuring has never been tried in this field. This field has not been flooded with fresh water.

REMARKS - Wells are pumped by individual gas engine units. The early wells had large initial productions in the Hundred Foot sand. One well produced 2400 barrel per day. Considerable connate water is produced with the oil. The pay in the Hundred Foot sand usually occurs from the top of the sand to 10 feet in the sand. The Boulder sand wells were never very large producers. No water is found in the Boulder sand. According to Sisler and others (1933), the Economy field was discovered in 1876.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 176.

BEAVER COUNTY, PENNSYLVANIA

FIELD NAME Harbinson Hollow FIELD NO. 107
 LOCATION: Township Chippewa and White
 County Beaver 7 1/2' Quadrangle Beaver Falls
 DISCOVERY DATE & WELL 1904

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Berea	225		
Total	225		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Berea	700	35	10	6-1/4	400

PRODUCING WELLS Unknown ABANDONED WELLS About 40
 WELL SPACING About 400' between wells

SAND CHARACTERISTICS - The Berea sand is a light-gray to white, quartzose rock of fine, even texture though locally reported pebbly. The pay streaks commonly occur at about 20 feet in the sand.

OPERATIONS - No secondary recovery methods have been tried. The sand probably contains too much water for successful secondary recovery operations.

REMARKS - The best well was Gailey, Figley and Ferguson's No. 3 on the Boyd Lease, and made 55 barrels of oil and 1 barrel of water daily. Others made up to 20 barrels of oil with water up to 10 barrels. After one year many wells were abandoned. The production of oil decreased and the water production increased with the life of the well. The pay streak is 15 to 20 feet below the top of the sand. The field has been limited by dry holes.

REFERENCE - DeWolf, Frank W., 1929, Pa. Geol. Survey, 4th ser., Atlas 5.

BEAVER COUNTY, PENNSYLVANIA

FIELD NAME Hookstown FIELD NO. 116
LOCATION: Township Greene
County Beaver 7 1/2' Quadrangle E. Liverpool N. & S.,
Hookstown & Midland
DISCOVERY DATE & WELL 1889, Jim Calhoon #1, 1P-600 barrels daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Berea	1250		
Total	1250		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Berea	1200	15	6	8-1/4,	300
				6-1/4	900

PRODUCING WELLS Unknown ABANDONED WELLS 400
WELL SPACING About 400' between wells
SAND CHARACTERISTICS - The Berea sand varies from a gray to white, fine-grained, compact sandstone to a coarse-grained, pebbly sandstone. The pay zone of the sand occurs in the coarse part of the sand.

OPERATIONS - A considerable part of this field has been depleted by an accidental water flood. This occurred in the coarse part of the sand where the water advanced rapidly through it. In this same general area, an air-drive project has been in operation. The production increased from 4 to 10 times. One experiment with vacuum was not successful.

REMARKS - The wells were pumped with jacks and a central power. In the early days no water was pumped with the oil. Later the wells started to produce water, and the water production continued to increase. One well pumped 92 barrels of water to 8 barrels of oil.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Ashley, George H., and Robinson, J. French, 1922, Pa. Geol. Survey, 4th ser., Min. Resource Rept. 1, v. 1; Woolsey, L. H., 1905, U. S. Geol. Survey, Geol. Atlas 134; data from present operators in the field.

BEAVER COUNTY, PENNSYLVANIA

FIELD NAME Kendall (includes Swearingen & Pumpkin Hollow) FIELD NO. 118
LOCATION: Township Hanover
County Beaver 7 1/2' Quadrangle E. Liverpool S., Hookstown
DISCOVERY DATE & WELL 1914, Buchannon #1, IP-about 5 barrels daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Berea	635		
Total	635		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Berea	1250	25	6	6-1/4	600 to 1000

PRODUCING WELLS Unknown ABANDONED WELLS 150
WELL SPACING About 400' between wells
SAND CHARACTERISTICS - The Berea sand varies from a gray to white, fine-grained, compact sandstone to a coarse-grained sandstone.

OPERATIONS - In the same general area an air-drive project on the Nicholls Farm has increased the oil production from 4 to 10 times. After 5 years of repressuring, 20 wells made 500 barrels a month. This project has had some corrosion, valve and emulsion trouble, but it is not considered serious. Vacuum has never been tried in this field.

REMARKS - Original initial productions averaged 20 barrels per day. This sand has been subjected to fresh-water intrusion from poor casing or poorly plugged wells which spoiled part of the field while other areas were not affected. In Pumpkin Hollow an early well had an initial production of 150 barrels per day. Wells were pumped with jacks and a central power.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); data from former operator in the field.

BEAVER COUNTY, PENNSYLVANIA

FIELD NAME New Galilee (includes Purdy, Madden Run & Elder) FIELD NO. 103 (101, 102, 104)
LOCATION: Township Darlington and Big Beaver
County Beaver 7 1/2' Quadrangle New Castle

DISCOVERY DATE & WELL New Galilee-1886; Purdy-1904; Fergus & Johnson well,
IP-probably 1 barrel daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Berea (Purdy Field)	1461		
Lower Connoquenessing	62		
Total	1523		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Berea	600 to 700	40	15	6-1/4	400
Lower Conno- quenessing	450	40	10		

PRODUCING WELLS Unknown ABANDONED WELLS 250

WELL SPACING 300 to 400 feet between wells

SAND CHARACTERISTICS - The Berea is a light-gray to white, quartzose rock of fine, even texture, though locally reported pebbly. The first pay lies 10 to 15 feet below the top of the sand, and a second pay 30 feet below the top. The pay zone is softer than the rest of the sand. The Lower Connoquenessing is a massive sandstone. The first pay lies 4 to 15 feet in the sand and the second pay at the bottom of the sand.

OPERATIONS - Secondary recovery methods were never tried in this field.

REMARKS - The Berea is so saturated that 10 to 20 barrels of water are pumped before any oil is obtained. The best well had an initial production of 7 barrels per day of oil, but settled to 3-1/2 barrels. General initial productions were 2-1/2 to 5 barrels of oil per day. Water to oil ratio is about 10:1. Parts of this field might repressure or water flood where the sand is fairly free from connate water. The initial productions of wells in the Purdy field ranged from 5 to 15 barrels per day. The largest well had initial production of 65 barrels per day. The sand is wet at the bottom and, hence, not drilled through.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); DeWolf, Frank W., 1929, Pa. Geol. Survey, 4th ser., Atlas 5.

BEAVER COUNTY, PENNSYLVANIA

FIELD NAME Shannopin FIELD NO. 120
 LOCATION: Township Independence, Hopewell (Findlay)
 County Beaver (Allegheny) 7 1/2' Quadrangle Aliquippa
 DISCOVERY DATE & WELL 1883

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	2875		
Total	2875		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1400 to 1800	30	10	8-1/4, 6-1/4	200 1050

PRODUCING WELLS Unknown ABANDONED WELLS 500
 WELL SPACING 500' between wells

SAND CHARACTERISTICS - The upper portion of this sand is hard, siliceous and perhaps impervious, while the lower part, or pay, is an open, sugary or pebbly sand, some pebbles as long as 1 inch. In the northern end of the field two pays occur. One pay is 5 feet in the sand, and the second pay is about 20 feet in the sand. In the southern end of the field only the bottom pay is found.

OPERATIONS - Vacuum has been on the field since 1913. The vacuum trippled the production. At the present time, a gas cycle is used in which the gas under a line pressure of 10 p.s.i. is introduced into an input well with a vacuum being pulled at the producing wells. This project doubled the production. Repressuring would probably be successful in this field.

REMARKS - Wells pump very little water in the northern part of the field, while about 1/3 of the field in the southern part has been watered out. The largest well was the Marks well, in 1886, which produced 3800 barrels a day. The wells are pumped by individual gas engine units.

REFERENCE - Anonymous, 1911, Report to the Petroleum Coordinator for National Defense (Unpublished); Ashley, George H., and Robinson, J. French, 1922, Pa. Geol. Survey, 4th ser., Min. Resource Rept. 1, v. 1; Woolsey, L. H., 1905, U. S. Geol. Survey, Geol. Atlas 134; data from present operators in the field.

BEAVER COUNTY, PENNSYLVANIA

FIELD NAME Smith's Ferry FIELD NO. 115
 LOCATION: Township Industry and Ohioville
 County Beaver 7 1/2' Quadrangle East Liverpool North and
Midland
 DISCOVERY DATE & WELL December 1860, Mssrs. Pattens, Finlens, Swan & Co. well

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Berea	1627		
 Total	 1627		

	Av. depth	Av. sand	Av. pay	Size of	Av. length of
Sands	to sand (ft.)	thickness (ft.)	thickness (ft.)	casing (in.)	casing (ft.)
Berea	1000	30	10	5-3/16	650

PRODUCING WELLS About 50 ABANDONED WELLS Over 2000
 WELL SPACING From town lot to 500 feet

SAND CHARACTERISTICS - The Berea sandstone varies from a blue, hard, fine-grained sandstone to a grayish-white, fine-grained sandstone. The first 10 feet of sandstone is generally hard and blue, then occurs 10 feet of pay sand which is fine and grayish white in color. The lower 10 feet of sand is hard and blue. Sometimes a second pay occurs from 23 to 25 feet in the sand.

OPERATIONS - Vacuum was used on a couple of leases and helped the production to some extent. Natural floods worked in the field from improperly plugged wells. This flood increased the production of the wells for about 1 year and then the wells were flooded out.

REMARKS - In the early days the initial productions were up to 100 barrels of oil day. The average initial production was from 1 to 2 barrels of oil per day. Very little gas was found in this field and the wells did not flow. In the early 1900's the wells made about 4,000 cu. ft. of gas. The water to oil ratio was about 3 to 1. Some of the wells were abandoned due to fresh-water intrusion, while others produced very little oil and were abandoned. The wells were pumped with jacks and central power. Production in this field is rather spotty. Some wells had a show of oil in an upper sand called the Salt sand.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Ashley, George H., and Robinson, J. French, 1922, Pa. Geol. Survey, ser., Min. Resource Rept. 1, v. 1; White, I. C., 1878, Pa. 2nd Geol. Survey, Rept. Woolsey, L. H., 1905, U. S. Geol. Survey, Geol. Atlas 134; data from former operators in the field.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Alameda Park - Crooked Run FIELD NO. 147

LOCATION: Township Butler and Center

County Butler 7 1/2' Quadrangle Butler and Mt. Chestnut

DISCOVERY DATE & WELL Alameda Park - 1900, Frazier #1, Crooked Run - 1860

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	85		
Third	135		
Total	220		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1300	70	8	6-1/4	750
Third	1550 to 1700	16	5	6-1/4	600

PRODUCING WELLS 0 ABANDONED WELLS 43

WELL SPACING About 400' between wells

SAND CHARACTERISTICS - The Hundred Foot sand varies from a light-gray to white, fine- to coarse-grained sandstone. The Third sand varies from dark gray to light gray in color and from a fine- to coarse-grained sandstone with grains 1/5 inch long.

OPERATIONS - Secondary recovery has never been tried in this field.

REMARKS - The wells were pumped with individual gas engine units. The Crooked Run field produces from the Hundred Foot sand and it had 5 producing wells averaging about 1/2 barrel of oil per well per day. The Alameda Park field produced from the Third sand. The wells in both fields have all been abandoned. Initial productions were reported up to 50 barrels per day for some wells in the early days. At least one well had initial production of 22 barrels per day. The wells averaged about 1 barrel a day of salt water.

REFERENCE - Data from former operators in the field; unpublished data from the files of the Pa. Geol. Survey; Lytle, W. S., and Heeren, L. A., 1955, Pa. Geol. Survey, 4th ser., Special Bull. 4.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Annisville - Ferris FIELD NO. 125
 LOCATION: Township Marion, Venango, and Washington
 County Butler 7 1/2' Quadrangle Hilliards and West Sunbury
 DISCOVERY DATE & WELL 1916

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
First	385		
Rosenberry	125		
Third	91		
Total	601		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
First	850	50	12	6-1/4	400
Rosenberry	950	25	7	6-1/4	925
Third	1150	20	10		

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
 WELL SPACING About 400' between wells

SAND CHARACTERISTICS - The First sand consists of two pay zones in the upper part of the sand body. Each pay is 6 to 7 feet thick. These pay sands are separated by about 6 feet of "tight", non-productive sandstone and are underlain by an 8-foot stratum of coarse pebbly water-bearing sandstone. The bottom 10 feet of the sand is hard and non-productive. The Rosenberry sand is a light-gray, coarse-grained to pebbly sandstone. The Third sand is a medium-grained to pebbly sandstone and ran from gray to light chocolate brown in color.

OPERATIONS - Secondary recovery methods have not been tried in this field.

REMARKS - The wells were pumped with jacks and central powers. Early wells produced up to 25 barrels of oil and 75 to 100 barrels of salt water daily. The First sand is water bearing over most of the Hilliards quadrangle. Therefore, wells producing from deeper sands must be cased through the First sand.

REFERENCE - Sherrill, R. E., and Matteson, L. S., 1939, Pa. Geol. Survey, 4th ser., Prog. Rept. 122; Sherrill, R. E., 1946, Pa. Geol. Survey, 4th ser., Special Bull. 3

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Branchton (Keisters) FIELD NO. 136
LOCATION: Township Slippery Rock
County Butler 7 1/2' Quadrangle Slippery Rock and West
Sunbury
DISCOVERY DATE & WELL 1912

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Second	253		
Total	253		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Second	1100	10	8	8-1/4, 6-1/4	400, 1000

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
WELL SPACING 300 feet

SAND CHARACTERISTICS - The Second sand typically is a medium-to fine-grained, light-gray sandstone about 40 feet thick. A medium-gray shale up to 10 feet thick is present in some areas. The lower sandstone layer is present and productive in the Branchton field.

OPERATIONS - Secondary recovery has never been tried in this field.

REMARKS - The wells were pumped by jacks with a central power. The first wells drilled in 1900 found Berea gas. When oil was discovered in the Second sand in 1912, the gas wells were drilled down for the oil production.

REFERENCE - Sherrill, R. E., and Matteson, L. S., 1939, Pa. Geol. Survey, 4th ser., Prog. Rept. 122; Sherrill, R. E., 1946, Pa. Geol. Survey, 4th ser., Special Bull. 3.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Brownsdale - Meharg FIELD NO. 156
 LOCATION: Township Penn and Jefferson
 County Butler 7 1/2' Quadrangle Butler and Saxonburg
 DISCOVERY DATE & WELL 1892, Campbell well, 1P-125 barrels daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	1032		
Third	1722		
Total	2754		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1400	100	10	6-1/4, 4-1/4	550, 1300
Third	1600 to 1900	20	11	6-1/4, 4-1/4	550, 1500

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
 WELL SPACING About 400' between wells

SAND CHARACTERISTICS - The Hundred Foot is a massive, fine-to medium-coarse-grained sandstone. Usually a softer pay zone occurs and sometimes a coarse pebbly pay. The pay generally occurs about 30 to 35 feet in the sand and is found above the break in the sand. The Third sand generally consists of 10 to 12 feet of grayish pebbly sand. Under this, about 2 feet of hard white sand is encountered and then 8 feet of good brownish, pebbly sugar sand.

OPERATIONS - A project with one input well was tried. Gas was injected and after a short time the gas blew through to another well. The project was abandoned. With proper operating procedures, air or gas drive probably would be successful.

REMARKS - The wells were pumped with individual gas engine units. Early initial productions ranged up to 300 barrels daily of oil. The Hundred Foot wells produced up to 200 barrels of water daily. In places, the entire Third sand contained oil. When no pay is encountered in the bottom of the sand, the sand is white to blue in color, fine and hard.

REFERENCE - Richardson, G. B., 1936, U. S. Geol. Survey, Bull. 873; data from present operators in the field; Lytle, W. S., and Heeren, L. A., 1955, Pa. Geol. Survey 4th ser., Special Bull. 7.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Bullion - Clintonville FIELD NO. 124
 LOCATION: Township Marion, Venango (Clinton and Irwin)
 County Butler 7 1/2' Quadrangle Barkeyville, Eau Claire
(Kennerdale and Polk)
 DISCOVERY DATE & WELL About 1860, Martin well, IP-1000 barrels daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Second	1084		
Third	636		
Total	1720		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Second	850 to 1250	28	10	6-1/4, 4-1/4	200 to 600
Third	600 to 1300	15	10		750 to 1150

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
 WELL SPACING About 300' between wells

SAND CHARACTERISTICS - The Second sand varies from a fine-grained sandstone in the main field to a coarse and pebbly sandstone in the small fields. The porosity is estimated at 20 percent with a permeability of less than 10 millidarcies over most of the main field, and in the order of several hundred millidarcies in the small ones. The Third sand ranges from a uniform medium-grained sand to a conglomeratic sand. The porosity in the poorer parts of the field averaged 11 percent and higher in the better parts. The permeability ranges from less than one to 50 millidarcies in the finer, more uniform sand to 3,500 or more in the more open sand.

OPERATIONS - Air-gas drive projects have been successful in the Second and Third sands. A water flood project in the Second was not economically successful. For years vacuum has been applied successfully to the Third sand and is still in use on some of the leases.

REMARKS - The wells are pumped with jacks and central powers. Corrosion due to water in the basal Pennsylvania Coal Measures is so severe in some cases that the 6-1/4-inch string must be cemented in or replaced every 2 or 3 years. One of the largest wells, the Rapp well, drilled about 1906, produced about 2000 barrels of oil daily. Some wells had initial productions of 3500 barrels of oil daily. Most of this field lies in Venango County. Only the part of the field that is in Butler County is discussed here.

REFERENCE - Dickey, Parke A., et al, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Sherrill, R.E., and Matteson, L.S., 1939, Pa. Geol. Survey, 4th ser., Prog. Rept. 122; Sherrill, R.E., 1946, Pa. Geol. Survey, 4th ser., Special Bull. 3.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Butler Cross Belt FIELD NO. 131
LOCATION: Township Concord, Fairview, Oakland, Parker (Perry and Bradys Bend)
County Butler (Armstrong) 7 1/2' Quadrangle Chicora, East Brady, East
Butler, Hilliards, Parker and Rimersburg
DISCOVERY DATE & WELL 1870, J. L. Mildren well

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	167	Knox Fourth	2,814
Snee	37	Third	10,357
Knox Third	41		
Total			13,416

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Knox Fourth	1480	30	10	6-1/4	700
Third	1525	25	14		

PRODUCING WELLS Unknown ABANDONED WELLS Unknown

WELL SPACING 1 well to every 4 acres (average)

SAND CHARACTERISTICS - The Knox Fourth sand is a coarse-grained, pebbly sandstone. The Third sand is a white, pebbly sandstone with the pay being softer. Some wells have several pay zones in the Third. These are separated by hard, tight sand breaks. The top of the Third in some areas is very loose and is locally called a "clover seed" sand.

OPERATIONS - Many of the wells have had vacuum on the Knox Fourth and Third sands for over 50 years. Repressuring with gas and air has been tried near Fairview but was not very successful.

REMARKS - Initial productions of the early wells were as high as 3000 barrels per day, but the average was about 100 barrels. Salt water in variable amounts is found in the Knox Fourth and Third sands. The wells were pumped both by central power and individual gas engines. Some wells in local areas are flooded out by fresh water. The entire field is discussed here.

REFERENCE - Dickey, Parke A., et al, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Shaw, E.W., and Munn, M.J., 1911b, U.S. Geol. Survey Bull. 454; Sherrill, R.E., and Matteson, L.S., 1939, Pa. Geol. Survey, 4th ser., Pro Rept. 122; Sherrill, R.E., 1946, Pa. Geol. Survey, 4th ser., Special Bull. 3; Lytle and Heeren, L.A., 1955, Pa. Geol. Survey, 4th ser., Special Bull. 7; Bergsten, J.M. and Heeren, L.A., 1961, Pa. Geol. Survey, 4th ser., Special Bull. 9.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Byram (extension of Emlenton-Richey Run field) FIELD NO. 127
 LOCATION: Township Allegheny and Venango
 County Butler 7 1/2' Quadrangle Eau Claire and Emlenton
 DISCOVERY DATE & WELL 1878

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Red Valley	76	Boulder	66
Second	1019	Knox Fourth	1502
Total			2663

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Red Valley	1115	25	10	6-1/4	400
Second	1160	36	11		
Boulder	1240	10	10		
Knox Fourth	1280	10	10		

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
 WELL SPACING About 400' between wells

SAND CHARACTERISTICS - The Red Valley sand is a light-gray, coarse-grained to pebbly sandstone. The Second sand is in two parts; the upper part is the main "pay" sand averaging 11 feet in thickness. The "pay" sand is very coarse grained to pebbly. The lower part of the sand is fine grained and productive in only a few wells. The Boulder sand is a medium-grained sandstone. The Knox Fourth is a soft, fine-grained, brownish-gray sand in which pebble streaks occur locally.

OPERATIONS - Vacuum has been used with success on some of the leases. Gas drive was tried in this field but no information is available on this project.

REMARKS - The wells were pumped with jacks and a central power. The initial productions of the early wells from Knox Fourth were up to 35 barrels daily. Very little salt water is encountered in this sand. The Boulder sand is spotty in production in this area. Some wells in the Second sand had initial productions as high as 50 barrels of oil daily.

REFERENCE - Shaw, E. W., and Munn, M. J., 1911b, U. S. Geol. Survey, Bull 454; Sherrill, R. E., and Matteson, L. S., 1939, Pa. Geol. Survey, 4th ser., Prog. Rept. 122; Sherrill, R. E., 1946, Pa. Geol. Survey, 4th ser., Special Bull. 3.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Callery-Watters (includes Ramsey & Lockwood) FIELD NO. 152
LOCATION: Township Jackson, Cranberry, Forward and Adams
County Butler 7 1/2' Quadrangle Evans City and Mars
DISCOVERY DATE & WELL 1898, Irvine #1

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	2413		
Snee	75		
Total	2488		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1400	90	10	6-5/8,	600,
Snee	1500	18	10	4-7/8	1300

PRODUCING WELLS None ABANDONED WELLS Unknown
WELL SPACING About 500' between wells

SAND CHARACTERISTICS - The Hundred Foot sand is generally gray or white above the break and white, blue or dark below it. The sand is medium in texture, but in its mass occurs thin, irregular lenses of coarse conglomeratic sand, composed largely of pebbles of white or yellow quartz. One to two pays are found in this sand. The first pay is found about 45 feet in the sand and the second is found in the bottom. The first is generally "clover seed" sand and the second is a white, coarse sand. Pay thicknesses in some wells are as much as 50 feet. The Snee is a coarse, white sandstone where productive.

OPERATIONS - Vacuum was tried in this field, but it did not increase the production. No other secondary method was tried. These fields have been flooded with water from sands above the Hundred Foot. Secondary recovery does not look favorable for this area.

REMARKS - Wells were pumped in this field with individual gas engine units. The early initial productions were as high as 1200 barrels per day. The wells produced considerable salt water (about 200 barrels a day) and were pumped 24 hours a day. The Berea sand above the Hundred Foot contains a great deal of salt water and this water probably entered the Hundred Foot sand through leaking casing or poorly plugged holes and flooded the sand.

REFERENCE - Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 176; Richardson, G. B., 1936, U. S. Geol. Survey, Bull. 873; data from former operator in the field.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Cherry Valley FIELD NO. 126
LOCATION: Township Venango
County Butler 7 1/2' Quadrangle Eau Claire
DISCOVERY DATE & WELL 1879

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Second	1677		
Total	1677		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Second	1100	36	11	6-1/4	400

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
WELL SPACING About 300' between wells

SAND CHARACTERISTICS - The lower one half or more of the Second sand body is fine grained and productive in only a few wells. The upper part of the sand is very coarse grained to pebbly and constitutes the main pay sand. This pay sand ranges from 5 to 23 feet and averages 11 feet in thickness. Locally it is overlain by thin conglomerate lenses containing disc-shaped pebbles up to 1 inch or more in diameter.

OPERATIONS - A gas drive project in this area has been successful.

REMARKS - The wells are pumped with jacks and a central power. The initial productions of the early wells ranged up to 50 barrels of oil daily. A great deal of this field is inactive.

REFERENCE - Sherrill, R. E., and Matteson, L. S., 1939, Pa. Geol. Survey, 4th ser., Prog. Rept. 122; Sherrill, R. E., 1946, Pa. Geol. Survey, 4th ser., Special Bull. 3.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Chicora FIELD NO. 142

LOCATION: Township Donegal, Fairview (Bradys Bend, Sugar Creek)

County Butler 7 1/2' Quadrangle Chicora

DISCOVERY DATE & WELL 1873

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Third	1551		
Total	1551		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Third	1600	30	6	6-1/4, 6-5/8	700, 1500

PRODUCING WELLS Unknown ABANDONED WELLS Unknown

WELL SPACING Varies from 1 well per acre to 1 well per 8 acres

SAND CHARACTERISTICS - The composition of the Third sand is variable and ranges from a fine- to coarse-grained sandstone with a softer pay zone.

OPERATIONS - Repressuring with gas in the Third sand has been tried in several local areas. In one case, production was more than doubled for some time. The field has been under vacuum for over 60 years.

REMARKS - The initial production of one well in the area was 1200 barrels per day. The Third sand has very little salt water. However, some comes in from the Hundred Foot sand above. The ratio of water to oil is about 1 to 4. The Third sand is flooded out with fresh water in some areas. The wells were pumped by jacks, powered by a central power plant.

REFERENCE - Dickey, Parke A., et al, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); data from present operators in the field.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Crider - Duncan FIELD NO. 164
LOCATION: Township Cranberry (Marshall)
County Butler (Allegheny) 7 1/2' Quadrangle Baden, Mars
DISCOVERY DATE & WELL 1893

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	128		
Snee	1741		
Total	1869		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1350	100	6	8, 6-5/8,	50, 650,
Snee	1650	12	6	8, 6-5/8, 5-3/16	50, 650, 1600

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
WELL SPACING About 600' between wells

SAND CHARACTERISTICS - The Hundred Foot sand is a coarse "clover seed" sand on top, changing to a white sugar sand. The pay is in the white sugar sand about 32 feet below the top. Occasionally another pay is encountered about 90 feet in the sand. The sand, other than pay, is dark and broken. The Snee sand is a white to gray, medium-grained sandstone.

OPERATIONS - Secondary recovery operations have not been tried in this field. The Hundred Foot sand in the Duncan field has been flooded with fresh water and the wells are now cased through the Hundred Foot sand. The northern end of the Crider field might have some fresh water in the sands.

REMARKS - The wells are pumped with individual gas engine units. Initial productions of wells in the Hundred Foot sand in the early days were up to 500 barrels per day. Initial productions in the Snee sand were up to 40 barrels daily. In recent years, the production of Hundred Foot wells averages 2/3 of a barrel daily of oil and about 9 barrels of water. The Snee sand wells produce about 1 barrel of water per week.

REFERENCE - Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 176; data from present operators in the field.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Emlenton - Richey Run FIELD NO. 128
 LOCATION: Township Allegheny
 County Butler 7 1/2' Quadrangle Emlenton
 DISCOVERY DATE & WELL 1879

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Knox Third	293		
Knox Fourth	528		
Total	821		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Knox Third	1150 to 1375	10	5	6-1/4	300 to 500
Knox Fourth	1200 to 1425	25	10		

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
 WELL SPACING 1 well to 2 acres

SAND CHARACTERISTICS - The Knox Third sand consists of a chocolate-colored, coarse-grained, pebbly pay in the top with a lighter, finer sand below. The Knox Fourth sand consists of a gray, hard, fine-grained, shaly sandstone with three coarse pebbly pays. The top pay is about 7 to 14 feet in the sand, the next pay is from 17 to 21 feet in, and the bottom pay from 25 feet to 28 feet in the sand.

OPERATIONS - Gas drive projects in the area have been successful.

REMARKS - Jacks and central powers were used to pump the wells. The Knox Fourth sand wells originally had initial productions up to 500 barrels of oil per day. Wells from the Knox Third sand have not been large.

REFERENCE - Dickey, Parke A., et al, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Shaw, E. W., and Munn, M. J., 1911b, U. S. Geol. Survey, Bull 454; Shaw, E. W., Lines, E. F., and Munn, M. J., 1911, U. S. Geol. Survey, Geol. Atlas 178; Bergsten, J.M.L., and Heeren, L. A., 1961, Pa. Geol. Survey 4th ser., Special Bull. 9.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Evans City FIELD NO. 151
 LOCATION: Township Forward and Jackson
 County Butler 7 1/2' Quadrangle Evans City

DISCOVERY DATE & WELL Evans City - 3/26/15, Kreitsburg well, IP-20 barrels daily;
1892, Hundred Foot sand

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	1280		
Snee	1379		
Third	700		
Total	3359		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1200	100	16	6-1/4,	600,
Snee	1400	20	10	6-1/4, 4-1/4	600, 1300
Third	1500	30	8		

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
 WELL SPACING About 400' between wells

SAND CHARACTERISTICS - The Hundred Foot sand usually contains one or more bands of shale. The upper 20 feet or so of sand is reported to be black and to be underlain by white sand. The pay is coarse and pebbly, which is described as "open" and "soft". The Snee sand is a fine-grained white sandstone. The pay consists of 10 feet of soft fine-grained sand near the middle of the bed. The sand above and below the pay is tight and hard. The Third sand is a gray, fine-grained sandstone, composed of rounded and semirounded grains of quartz and feldspar and flakes of sericite in a clayey matrix. Some samples of the sand are medium to coarse grained, composed of larger grains and small pebbles of quartz, as much as 1/5 inch in diameter. Often there are two soft, open, sugary pay streaks.

OPERATIONS - Secondary recovery operations have not been tried in this area.

REMARKS - The wells are pumped with individual gas engine units. The largest field well had an initial production of 1250 barrels a day. The Third sand is lenticular and ranges from less than 1 foot to 51 feet in thickness. In some wells the pay was 34 feet thick. Most of the oil in this field came from the Third and Snee sands. The Third sand in the Evans City field is reported to be free from water. According to Sisler and others (1933), the Evans City field was discovered in 1892.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Richardson, G. B., 1936, U. S. Geol. Survey, Bull. 873.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Garvin (includes Dumbaugh field) FIELD NO. 165

LOCATION: Township Cranberry

County Butler 7 1/2' Quadrangle Baden and Mars

DISCOVERY DATE & WELL 1893, B. W. Garvin well, IP-200 barrels daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	664		
Total	664		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1400	105	10	6-5/8, 4-7/8	500, 1300

PRODUCING WELLS None ABANDONED WELLS 100

WELL SPACING About 600' between wells

SAND CHARACTERISTICS - The Hundred Foot sand consists of about 20 feet of dark sand at the top with gray or white sand below. The pays are composed of coarse sand and small quartz pebbles. The first pay is sometimes found near the top of the sand. The second pay is found from 55 to 70 feet below the top and ranges from 3 to 10 feet in thickness.

OPERATIONS - The field had vacuum on it for a short time. Repressuring was never tried in this field. The field has been flooded with fresh water and does not look promising for secondary recovery.

REMARKS - Wells in this field were pumped by jacks and central powers. The wells produced a lot of salt water. The water to oil ratio was sometimes 5 to 1. The field has been inactive since 1935.

REFERENCE - Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 176; data from former operator in the field.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Glade Run FIELD NO. 153
 LOCATION: Township Forward and Middlesex
 County Butler 7 1/2' Quadrangle Butler, Evans City, Mars,
and Valencia
 DISCOVERY DATE & WELL 1886

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	1345		
Third	547		
Total	1892		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1450	100	16	6-1/4	600,
Third	1750	50	20	6-1/4, 4-1/4	600, 1550

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
 WELL SPACING 400 feet

SAND CHARACTERISTICS - The Hundred Foot sand usually contains one or more bands of shale. The upper 20 feet or so of sand is reported to be black and to be underlain by white sand. The pay is coarse and pebbly, which is described as "open" and "soft". The Third sand is a gray, fine-grained sandstone, composed of rounded and semi-rounded grains of quartz and feldspar and flakes of sericite in a clayey matrix. Some samples of the sand are medium to coarse grained, composed of larger grains and small pebbles of quartz, as much as 1/5 inch in diameter. Often there are two soft, open, sugary pay streaks.

OPERATIONS - Secondary recovery has never been tried.

REMARKS - The Third sand attained its maximum development in 1887. Behm No. 6 was the best well with an initial production of 6000 barrels of oil daily. The Third sand is reported to have been drowned by water entering the sand from some of the upper sands through improperly plugged abandoned wells.

REFERENCE - Richardson, G. B., 1932, U. S. Geol. Survey, Bull. 829; Richardson, G. B., 1936, U. S. Geol. Survey, Bull. 873; Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 176; Lytle, W. S., and Heeren L. A., 1955, Pa. Geol. Survey, 4th ser., Special Bull. 7.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Harmony - Zelienople FIELD NO. 150

LOCATION: Township Jackson, Lancaster (Marion)

County Butler (Beaver) 7 1/2' Quadrangle Zelienople

DISCOVERY DATE & WELL About 1889

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	1072		
Total	1072		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1100 to 1400	50	10	8-1/4, 6-1/4	600, 1050

PRODUCING WELLS None ABANDONED WELLS All

WELL SPACING About 400' between wells

SAND CHARACTERISTICS - The Hundred Foot sand is usually a hard, fine-grained sand, variable in composition. The pay is commonly a coarse-grained pebbly bed which is "open" and "soft".

OPERATIONS - Secondary recovery operations were never tried. This field is completely watered out and does not look favorable for secondary recovery.

REMARKS - The wells were pumped with individual gas engine units. The initial production of the best well was 1,000 barrels daily. This was a town lot development. The sand was flooded and became inactive about 1902. Later, spotty production was obtained from the Boulder sand about 150 feet below the Hundred Foot. Part of this field is in Beaver County, but the entire acreage is discussed here. According to Sisler and others (1933), the Zelienople field was discovered in 1900.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Richardson, G. B., 1936, U. S. Geol. Survey, Bull 873.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Hooker FIELD NO. 132
 LOCATION: Township Fairview and Concord
 County Butler 7 1/2' Quadrangle East Butler and Hilliards
 DISCOVERY DATE & WELL 1901

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	51		
Third	39		
Speechley	3269		
Total	3359		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	900 to 1200	105	10	6-1/4	550 to 630
Third	1200 to 1500	20	12		
Speechley	2150 to 2350	25	15		

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
 WELL SPACING About 6 to 10 acres per well

SAND CHARACTERISTICS - The Hundred Foot is a massive, fine-to medium-coarse-grained sandstone. The Third sand pay is medium to fine grained and generally lies in the upper part of the sand body. The Speechley sand is a chocolate-colored, uniform, fine-grained, hard sandstone where productive.

OPERATIONS - A gas drive project was successful in the Third sand. Water flooding and repressuring have been attempted without success in the Speechley sand.

REMARKS - The wells were pumped with individual gas engine units. The initial daily productions of the wells were up to 75 barrels. The wells averaged about 24 barrels daily. The Speechley sand contains very little water.

REFERENCE - Sherrill, R. E., and Matteson, L. S., 1939, Pa. Geol. Survey, 4th ser., Prog. Rept. 122; Sherrill, R. E., 1946, Pa. Geol. Survey, 4th ser., Special Bull. 3; Lytle, W. S., and Heeren, L. A., 1955, Pa. Geol. Survey, 4th ser., Special Bull. 7.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Hoover FIELD NO. 135
LOCATION: Township Washington, Concord and Clay
County Butler 7 1/2' Quadrangle East Butler, Hilliards and
West Sunbury
DISCOVERY DATE & WELL 1892, Lackey well

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Third	2268		
Fourth	56		
Total	2324		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Third	1200 to 1500	20	12	6-1/4	1100
Fourth	1250 to 1550	20	10		

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
WELL SPACING About 1 acre per well

SAND CHARACTERISTICS - The Third sand is up to 30 feet in thickness. The pay sand is medium to fine grained, generally lies in the upper part of the sand body and is up to 20 feet in thickness. The average porosity is about 10 percent with a permeability up to 56 millidarcies but less than 4 millidarcies for most of the sand. The Fourth sand is fine to medium grained.

OPERATIONS - Gas drive projects in the area have been successful.

REMARKS - The wells were pumped with jacks and central powers. Also some individual pumping units were used. Early wells produced up to 60 barrels of oil daily. Producers are bothered by the collection of paraffin in the well. Small quantities of water are produced with the oil. Part of this field has been flooded with fresh water which is moving southward.

REFERENCE - Sherrill, R. E., and Matteson, L. S., 1939, Pa. Geol. Survey, 4th ser., Prog. Rept. 122; Sherrill, R. E., 1946, Pa. Geol. Survey, 4th ser., Special Bull. 3; Lytle, W. S., and Heeren, L. A., 1955, Pa. Geol. Survey, 4th ser., Special Bull. 7.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Jefferson Center - Herman FIELD NO. 145
 LOCATION: Township Jefferson, Summit, Clearfield
 County Butler 7 1/2' Quadrangle Saxonburg
 DISCOVERY DATE & WELL 1887

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	509		
Knox Fourth	526		
Third	1393		
Total	2428		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1500		10	6-1/4,	700,
Knox Fourth	1750	20	8	4-7/8	1500
Third	1800	20	12		

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
 WELL SPACING 350' between wells

SAND CHARACTERISTICS - The Hundred Foot is a massive fine-to medium-grained sandstone. The Knox Fourth is a very soft fine-grained sandstone. The Third sand ranges from a white sugar sand to a dark clover seed sand in the pay zones and is white and hard where non-productive. Some pebbles occur and are up to 1/2 inch in length. A 3-to 8-foot shale break generally occurs near the bottom of the sand. The first pay zone occurs in the top of the sand and sometimes a second pay zone occurs below the break about 20 feet in the sand.

OPERATIONS - One small gas drive project was tried in the Third sand with some success. The direction of the drive could not be determined before injection started. Production was increased in wells on an adjoining lease. Gas drive probably would prove successful, if a project was tried in an area where the sand was more uniform. Most of the field was operated under vacuum for 15 to 20 years. Vacuum increased the production a great deal.

REMARKS - The wells were pumped with individual gas engine units. Initial productions of early Third sand wells were up to 2500 barrels daily. Very little water was produced with this oil. Oil was produced from an area of about 25 acres from a sand between the Boulder and Thirty Foot sands. The sand averaged about 6 feet thick and wells producing from this sand had initial productions up to 100 barrels daily of oil and 10 barrels of water. The sand is a white, fine-grained, hard sandstone.

REFERENCE - Richardson, G. B., 1936, U. S. Geol. Survey, Bull. 873; data from present operators in the field; Lytle, W. S., and Heeren, L. A., 1955, Pa. Geol. Survey, 4th ser., Special Bull. 7.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Little Creek FIELD NO. 148
 LOCATION: Township Connoquenessing and Forward
 County Butler 7 1/2' Quadrangle Butler, Evans City, and
Prospect
 DISCOVERY DATE & WELL Hundred Foot-1889; Snee-1906, Rose #2, IP-15 barrels daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	3681		
Snee	2000		
Total	5681		

	Av. depth	Av. sand	Av. pay	Size of	Av. length of
Sands	to sand (ft.)	thickness (ft.)	thickness (ft.)	casing (in.)	casing (ft.)
Hundred Ft.	1100 to 1400	100	16	6-1/4,	600,
Snee	1200 to 1520	18	10	6-1/4,	600,
				4-1/4	1400

PRODUCING WELLS Unknown ABANDONED WELLS 500
 WELL SPACING About 250' between wells

SAND CHARACTERISTICS - The Hundred Foot sand usually contains one or more bands of shale. One of these shale partings is 3 feet thick and occurs about 17 feet below the top of the sand. The upper 20 feet or so of sand is reported to be black sand and to be underlain by white sand. The pay is coarse and pebbly, which is described as "open and soft". Commonly there are two pay streaks. The Snee sand where productive has a coarse "clover seed" pay on top or a soft very white sugar sand pay which occurs near the middle of the sand. Where non-productive the sand is hard and blue.

OPERATIONS - Secondary operations have not been tried in this field. Accidental water floods in this area have shown no increase in production of oil. The Hundred Foot sand is flooded and does not look very promising for secondary recovery. Although the Snee sand produces a great deal of water, it might respond to repressuring.

REMARKS - The wells were pumped with individual gas engine units. Hundred Foot wells had initial productions ranging up to 1500 barrels daily. This sand has been entirely flooded with fresh water. The pay streaks in this sand contained salt water and oil and water were produced together. The Snee sand wells had initial productions up to 15 barrels a day and were long lived. The water to oil ratio varied from 1:1 to 10:1. The top "clover seed" pay occurs most frequently. Spotty Boulder production is sometimes encountered.

REFERENCE - Richardson, G. B., 1936, U. S. Geol. Survey, Bull. 873; data from present operators in the field; Lytle, W. S., and Heeren, L. A., 1955, Pa. Geol. Survey 4th ser., Special Bull. 7.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Mars - Glade Mills - Valencia FIELD NO. 163, 162, 5
LOCATION: Township Adams, Penn, Middlesex (Pine and Richland)
County Butler 7 1/2' Quadrangle Mars and Valencia

DISCOVERY DATE & WELL 1890

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	6282		
Total	6282		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1400	120	8	10, 8-1/4, 6-5/8	200, 850, 1500

PRODUCING WELLS Unknown ABANDONED WELLS 450
WELL SPACING About 400' between wells

SAND CHARACTERISTICS - The Hundred Foot sand consists of 2 members separated by a shale break in the middle of the formation. The sand is hard and fine grained, with softer pay streaks. Generally there are 2 pay streaks and sometimes four. The upper pay streak occurs about 20 feet in the sand, and the lower streak about 50 feet below the top of the sand, just below the shale break.

OPERATIONS - Secondary recovery methods have not been tried in this field.

REMARKS - The wells were pumped with individual gas engine units. Most of this field has been flooded with fresh water except for a few isolated areas. The initial productions of early wells were as high as 100 barrels per day. The water to oil ratio was as high as 10 to 1. The Fourth sand is spotty in production in this area. One well had an initial production of 50 barrels per day from an 11-foot pay streak. According to Sisler and others (1933), the Glade Mills field was discovered in 1876.

REFERENCE -Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Richardson, G. B., 1932, U. S. Geol. Survey, Bull. 829.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Muddy Creek FIELD NO. 138

LOCATION: Township Muddy Creek, Franklin and Brady

County Butler 7 1/2' Quadrangle Prospect

DISCOVERY DATE & WELL 1889, Shaner, IP-about 4 barrels daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Berea	1272		
Total	1272		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Berea	850 to 1150	15	10	6-1/4	600

PRODUCING WELLS 0 ABANDONED WELLS 360

WELL SPACING About 275' between wells

SAND CHARACTERISTICS - The Berea sandstone ranges from a dark-gray, hard, fine-grained sandstone to a coarse-grained sandstone. The oil pay is found in the upper part of the sand. If a coarse sand is found in the bottom of the sandstone, fresh water is usually encountered.

OPERATIONS - Vacuum was tried in this field, but was unsuccessful. Portions of this field have been under a natural water flood since 1904. The water is coming from improperly plugged wells.

REMARKS - The wells were pumped with jacks and central power. The early wells did not flow and made only a small amount of gas. The initial productions of the early wells were up to 80 barrels a day. None of the wells were large producers, but are long lived. Some wells, after having produced for 20 years, yield between 2 and 3 barrels a day. The oil production in this field is somewhat spotted.

REFERENCE -Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Richardson, G. B., 1936, U. S. Geol. Survey, Bull. 873; data from present operators in the field.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Oneida FIELD NO. 140
LOCATION: Township Center and Oakland
County Butler 7 1/2' Quadrangle East Butler and Mt. Chestnut
DISCOVERY DATE & WELL 1885

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	1130		
Third	100		
Total	1230		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1200	105	10	6-1/4	650
Third	1500	20	12	6-1/4, 4-7/8	650, 1250

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
WELL SPACING About 400' between wells

SAND CHARACTERISTICS - The Hundred Foot is a massive, fine-to medium-coarse-grained sandstone. Usually a softer pay zone occurs and sometimes a coarse pebbly pay. Occasionally there are two pays in this sand. The pay is generally found about 5 feet below the bottom of the break. The break is sometimes 40 feet thick. The Third sand ranges from a white sugar sand to a dark, clover seed sand in the pay zones, and is white and hard where non-productive.

OPERATIONS - Secondary recovery operations have not been tried.

REMARKS - The wells were pumped with individual gas engine units and with jacks and a central power. Initial productions of the early wells were up to several hundred barrels. The average initial production was less than 50 barrels daily. The Hundred Foot in some areas contains large amounts of water. These wells are pumped 24 hours a day. This area contains spotty Boulder and Third sand production.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Richardson, G.B., 1936, U.S. Geol. Survey, Bull. 873; unpublished data from the files of the Pa. Geol. Survey; Lytle, W.S., and Heeren, L.A., 1955, Pa. Geol. Survey, 4th ser., Special Bull. 7.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Parker (includes Sucker Rod field) FIELD NO. 130
 LOCATION: Township Parker, Allegheny (Hovey and Perry)
 County Butler (Armstrong) 7 1/2' Quadrangle Emlenton and Parker
 DISCOVERY DATE & WELL 1869

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	213	Knox Fourth	9,035
Second	693	Third	162
Knox Third	49		
Total			10,152

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1280	60	12		
Second	1450	25	10	6-1/4	500
Knox Third	1510	15	10		
Knox Fourth	1550	30	20		
Third	1590	15	10		

PRODUCING WELLS Unknown ABANDONED WELLS Unknown

WELL SPACING Average 1 well to every 4 acres

SAND CHARACTERISTICS - The Hundred Foot sand ranges from coarse grained to pebbly. Two pays are present, one at the top and one at the bottom of the sand. The second sand is a medium-to fine-grained light-gray sandstone. The Knox Third sand is a medium-grained light-gray sandstone. The Knox Fourth is a white sand and varies from a broken, shaly, coarse-grained sandstone to a loose, pebbly sandstone. Sometimes it contains 2 pays which are about 8 feet apart.

OPERATIONS - Most of the area is under vacuum which has slightly aided the production of oil. The Parker field has responded to gas drive and water flooding.

REMARKS - About 75 percent of the field is inactive. Initial production from the Third sand ranged from 35 to 1000 barrels per day. Wells producing from the Hundred Foot had initial productions as high as 2000 barrels per day, with an average of about 50 barrels. About 1 barrel of salt water is produced with each barrel of oil. There is some evidence of a natural water drive southwest of Parker City. The wells are pumped by jacks using a central power station.

REFERENCE - Dickey, Parke A., et al, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Shaw, E.W., and Munn, M.J., 1911b, U.S. Geol. Survey Bull. 454; data from present operators in the field; Lytle, W.S., and Heeren, L.A., 1955, Pa. Geol. Survey, 4th ser., Special Bull. 7; Bergsten, J.M., and Heeren, L.A., 1961, Pa. Geol. Survey, 4th ser., Special Bull. 9.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Queen Junction FIELD NO. 139
 LOCATION: Township Brady, Franklin, Center and Clay
 County Butler 7 1/2' Quadrangle Mt. Chestnut
 DISCOVERY DATE & WELL October 1936, Rockenstein #1, IP-20 barrels daily

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	75		
Knox Fourth	30		
Third	18		
Total	123		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1100	90	10	8-1/4, 6-1/4	50, 600
Knox Fourth	1350	8	5	6-1/4, 4-7/8	600, 1270
Third	1410	30	10		

PRODUCING WELLS 0 ABANDONED WELLS 35
 WELL SPACING About 400' between wells

SAND CHARACTERISTICS - The Hundred Foot sand is a fine-to medium-grained sandstone, with a coarser, sometimes pebbly, pay. Sometimes two pays occur. The top pay is most frequently encountered at about 12 feet in the sand. The second pay is found about 30 feet in the sand. The Knox Fourth sand is a fine-to medium-grained sandstone; the pay, which contains some pebbles, occurs about 2 feet in the sand. The Third sand is a medium-grained light-gray sandstone.

OPERATIONS - Secondary operations have not been tried in this field.

REMARKS - The wells were pumped with individual gas engine units. The Hundred Foot oil in this district is very heavy and black in color. The early wells had initial productions up to 10 barrels daily. The Knox Fourth wells had initial productions up to 40 barrels daily. Water has flooded the Knox Fourth sand. The Hundred Foot sand has never been flooded. The total oil production in the Queen Junction field proper, from the date of discovery (October 1936) to January 1, 1947, was 13,685 barrels.

REFERENCE - Unpublished data from the files of the Pa. Geol. Survey; Lytle, W. S., and Heeren, L. A., 1955, Pa. Geol. Survey, 4th ser., Special Bull. 7.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Rattigan FIELD NO. 143
 LOCATION: Township Donegal and Clearfield
 County Butler 7 1/2' Quadrangle Chicora, Saxonburg, and
Worthington
 DISCOVERY DATE & WELL #1 John F. Rogers

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Third	1307		
Total	1307		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Third	1750	25	10	8-1/4, 6-1/4	50, 700

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
 WELL SPACING 600 feet

SAND CHARACTERISTICS - The Third sand is a fine-to coarse-grained sandstone with pebbles up to .2 of an inch in diameter. The good pay is a soft, open, sugary sand with locally some pebbles.

OPERATIONS - Secondary recovery has never been tried.

REMARKS - The wells were pumped by jacks and a central power or by individual pumping units. Initial productions of up to 100 barrels daily were recorded in the early days. There is spotty production from the Hundred Foot sand and Knox Fourth sand. The Hundred Foot does not contain water.

REFERENCE - Butts, Charles, 1904, U. S. Geol. Survey, Geol. Atlas 115; Lytle, W.S., Heeren, L. A., 1955, Pa. Geol. Survey, 4th ser., Special Bull. 7; operators in the

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Renfrew - McCalmont FIELD NO. 154
LOCATION: Township Butler, Forward, Penn and Connoquenessing
County Butler 7 1/2' Quadrangle Butler
DISCOVERY DATE & WELL 1882, Weber well

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	602	Knox Fourth	75
Thirty Foot	139	Third	4329
Total			5145

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1400	105	10	6-1/4, 4-1/4	650, 1250 to
Thirty Foot	1500	20	10		1450
Knox Fourth	1600	20	8		
Third	1650	30	8		

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
WELL SPACING About 350' between wells

SAND CHARACTERISTICS - The Hundred Foot sand consists of "clover seed" sand on top, changing to a white sugar sand and then to a harder and finer barren sand. The pay occurs about 30 feet in the sand. The Thirty Foot sand is a white, pebbly, medium-grained sand. The Knox Fourth sand consists of a chocolate, very soft, fine sand where productive and a much harder sand where unproductive. The Third sand consists generally of a very dark sand on top about 3 to 5 feet thick. Then a 5-foot bed of white, very coarse, pebbly sand occurs, which is the pay horizon. The next 10 feet is generally broken and the last 5 to 8 feet is a sugar pay sand, if present.

OPERATIONS - Vacuum has been in operation in this field for years and has been very successful. No other secondary recovery operation has been tried. Some of this area is reacting to an accidental water flood and the wells have increased considerably in the production of oil.

REMARKS - The wells were pumped with individual gas engine units. Very little water is produced from the Third sand. The initial productions of early wells were up to 2000 barrels daily in this sand. The Knox Fourth sand wells had initial productions up to 15 barrels of oil daily and no water. The Thirty Foot sand wells had initial productions up to 75 barrels of oil a day and some wells had oil to water ratios of 1:2. The Hundred Foot sand had initial productions up to 100 barrels of oil daily and up to 1800 barrels of water daily.

REFERENCE - Richardson, G. B., 1936, U. S. Geol. Survey, Bull. 873; Lytle, W. S., and Heeren, L. A., 1955, Pa. Geol. Survey, 4th ser., Special Bull. 7; data from present operators in the field.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Rosenberry FIELD NO. 129

LOCATION: Township Allegheny

County Butler 7 1/2' Quadrangle Emlenton and Parker

DISCOVERY DATE & WELL 1895, J. Rosenberry well

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Red Valley	385	Knox Fourth	176
Second	585	Third	355
Total			1501

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Red Valley	1280	50	12	6-1/4	500
Second		40	10		
Knox Fourth		30	20		
Third		15	10		

PRODUCING WELLS Unknown ABANDONED WELLS Unknown

WELL SPACING 300 to 400 feet

SAND CHARACTERISTICS - The Red Valley sand is a light-gray, coarse-grained to pebbly sandstone. The Second sand is a medium-to fine-grained, light-gray sandstone. The Knox Fourth is a white sand and varies from a broken, shaly, coarse-grained sandstone to a loose, pebbly sandstone. The Third sand is a medium-grained, light-gray sandstone.

OPERATIONS - Repressuring by using gas at low pressures has worked in the northern end of the field. This has increased production from 1/4 to 8 barrels per day in some wells. Vacuum has also been in operation for many years.

REMARKS - Early initial productions of the wells were as high as 2000 barrels per day with the average being about 50. The wells were pumped by jacks using central gas engine power.

REFERENCE - Dickey, Parke A., et al, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Bergsten, J. M., and Heeren, L. A., 1961, Pa. Geol. Survey, 4th ser., Special Bull. 9; data from present operators in the field.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Rough Run FIELD NO. 144
LOCATION: Township Clearfield and Winfield
County Butler 7 1/2' Quadrangle Saxonburg and Worthington
DISCOVERY DATE & WELL Unknown

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Third	1362		
Total	1362		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Third	1800	30	12	8-1/4, 6-1/4	40, 650

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
WELL SPACING 500 feet

SAND CHARACTERISTICS - The Third sand is a fine-to coarse-grained sandstone, in places conglomeratic. The good pay is a sugary sand.

OPERATIONS - Secondary recovery has never been tried.

REMARKS - The wells were pumped by jacks and a central power or by individual pumping units. There is spotty production from the Hundred Foot and Knox Fourth.

REFERENCE - Butts, Charles, 1904, U. S. Geol. Survey, Geol. Atlas 115; Lytle, W. S., and Heeren, L. A., 1955, Pa. Geol. Survey, 4th ser., Special Bull. 7; operators in the field.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Saxonburg FIELD NO. 158
LOCATION: Township Jefferson and Penn
County Butler 7 1/2' Quadrangle Butler, Curtisville, Saxonburg
and Valencia
DISCOVERY DATE & WELL Hundred Foot-1949, IP-6 barrels per day; Third-1888, Lonitz #1
IP-2000 barrels per day

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	101		
Third	657		
Total	758		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1500	120	9	8-1/4, 6-1/4,	36, 650
Third	1820	35	9	4-7/8	1600

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
WELL SPACING 400 feet

SAND CHARACTERISTICS - The Hundred Foot sand is fine to coarse grained with a break in the sand about in the middle. The Third sand is a fine-to coarse-grained sandstone. The first pay is pebbly, 8 feet thick, and found about 10 feet below the top of the sand. The second pay is in the bottom of the sand and is about 2 feet thick. Most of the oil was produced from the upper pay. No water in the Third sand

OPERATIONS - Vacuum was used on the Third sand for years and increased the production a great deal. A pilot gas drive was tried, but it was not successful. Some of the wells have been flooded with fresh water.

REMARKS - The wells were pumped by jacks and a central power. Some wells were pumped with individual units. A number of wells had large initial productions, and they produced oil for many years. The largest Third sand well had an initial production of 125 barrels of oil per hour.

REFERENCE - Lytle, W. S., and Heeren, L. A., 1955, Pa. Geol. Survey, 4th ser., Special Bull. 7; Richardson, G. B., 1936, U. S. Geol. Survey, Bull. 873; operators in the field.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Shira Streak FIELD NO. 134
LOCATION: Township Washington, Parker and Allegheny
County Butler 7 1/2' Quadrangle Eau Claire, Emlenton, and
Hilliards
DISCOVERY DATE & WELL 1893, Alexander Bell well

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
First	181		
Boulder	40		
Shira	1888		
Total	2109		

	Av. depth	Av. sand	Av. pay	Size of	Av. length of
Sands	to sand (ft.)	thickness (ft.)	thickness (ft.)	casing (in.)	casing (ft.)
First	1150 to 1425	50	11	6-1/4	500
Boulder		10	10		
Shira	1300	10	9		

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
WELL SPACING About 400' between wells

SAND CHARACTERISTICS - The First sand is a fine-to coarse-grained, gray sandstone. The Boulder sand is a medium-grained to pebbly sandstone. The Shira sand is a greenish-gray, medium-grained to pebbly sandstone. The top one foot or less contains pebbles up to 1 inch or more in diameter and is gas bearing. The oil pay sand is medium grained and averages 9 feet in thickness.

OPERATIONS - Air and gas drive projects have been successful in this field.

REMARKS - The wells were pumped with jacks and a central power. Early wells had initial productions up to 100 barrels daily. Many of the early wells are abandoned. Very little water is produced with the oil.

REFERENCE - Sherrill, R. E., and Matteson, L. S., 1939, Pa. Geol. Survey, 4th ser., Prog. Rept. 122; Sherrill, R. E., 1946, Pa. Geol. Survey, 4th ser., Special Bull. 3.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Thorn Creek FIELD NO. 155

LOCATION: Township Penn

County Butler 7 1/2' Quadrangle Butler

DISCOVERY DATE & WELL 1884, Armstrong #1

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	46		
Third & Fourth	609		
Total	655		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1250	100	15	5-5/8	600
Third & Fourth	1550	40	30	4-1/4	1200

PRODUCING WELLS 0 ABANDONED WELLS 178

WELL SPACING 350' between wells

SAND CHARACTERISTICS - The Third and Fourth sands appear to run together in this field and obtain a maximum thickness of 65 feet. The sand ranges from a white, fine, hard sandstone to a grayish-white, very coarse, pebbly sandstone, with flat well-worn pebbles up to an inch in diameter. In the best part of the field, the entire sand is pay sand. In places a hard streak occurs in the middle of the sand body. The permeability is over 1500 millidarcies in the looser part of the sand. The Hundred Foot sand is a white to grayish sandstone with a "clover seed pay".

OPERATIONS - Vacuum was on the field for years and was very successful during the years of operation. Parts of the field are reported to have been flooded by water from poorly plugged wells. The flood is said to have started at both ends of the field and worked toward the center. Air or gas drive or water flooding does not look promising for this area.

REMARKS - The wells were pumped by individual gas engine units. Initial productions in the early days were up to 10,000 barrels of oil daily. Very little water is produced from the Third and Fourth sand. The rest of the production is from the Hundred Foot sand. The Hundred Foot sand produced about 50 barrels of water daily per well. Initial productions of Hundred Foot wells were as high as 30 barrels of oil.

REFERENCE - Richardson, G. B., 1936, U. S. Geol. Survey, Bull. 873; Lytle, W. S. and Heeren, L. A., 1955, Pa. Geol. Survey, 4th ser., Special Bull. 7; data from present operators in the field.

BUTLER COUNTY, PENNSYLVANIA

FIELD NAME Wadsworth - North Oakland FIELD NO. 141
 LOCATION: Township Oakland, Donegal, Clearfield, Fairview, and Summit
 County Butler 7 1/2' Quadrangle Chicora, East Butler, and
Saxonburg
 DISCOVERY DATE & WELL 1874

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	1108	Knox Fourth	6243
Thirty Foot	39	Third	1004
Total			8394

	Av. depth	Av. sand	Av. pay	Size of	Av. length of
Sands	to sand (ft.)	thickness (ft.)	thickness (ft.)	casing (in.)	casing (ft.)
Hundred Ft.	1250	90	8	6-1/4,	600,
Thirty Foot	1400	15	5	4-7/8	1350
Knox Fourth	1525	30	10		
Third	1575	20	10		

PRODUCING WELLS	<u>Unknown</u>	ABANDONED WELLS	<u>Unknown</u>
WELL SPACING	<u>About 1 well per 4 acres</u>		

SAND CHARACTERISTICS - The Hundred Foot sand where productive is white to brown, coarse grained to pebbly. The Thirty Foot sand is a light-gray, coarse-grained to pebbly sandstone. The Knox Fourth sand is variable in composition and ranges from fine to coarse grained. The Third is a white, coarse-grained sandstone with a pebbly "clover seed" pay. The Hundred Foot has two pays in some wells.

OPERATIONS - No secondary recovery operations have ever been tried in this field. Most of the Knox Fourth and Third sand wells have been under vacuum for over 50 years. Vacuum has never been tried on the Hundred Foot.

REMARKS - A well, a half mile northeast of North Oakland, had an initial production from the Knox Fourth sand of about 1,000 barrels per day. The Hundred Foot sand wells had initial productions of smaller volume. Only the Hundred Foot contains any appreciable amount of salt water. The eastern side of this field is principally Knox Fourth sand production, while the Third and Hundred Foot production is mostly on the west.

REFERENCE - Dickey, Parke A., et al, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Lytle, W. S., and Heeren, L. A., 1955, Pa. Geol. Survey, 4th ser., Special Bull. 7; data from present operators in the field.

WASHINGTON COUNTY, PENNSYLVANIA

FIELD NAME Amity FIELD NO. 200
 LOCATION: Township Morris
 County Washington 7 1/2' Quadrangle Prosperity and Amity
 DISCOVERY DATE & WELL 1898, Dunn #2, IP-10 BOPD

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Gantz	237		
Total	237		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Gantz	2700	30	20	10, 8-1/4, 6-5/8	950, 1250, 2025

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
 WELL SPACING 700 feet
 SAND CHARACTERISTICS - The Gantz sand is a fine-to coarse-grained sandstone with occasional pebble beds and is light gray in color.

OPERATIONS - Secondary recovery has never been tried in this field.

REMARKS - Initial productions of early wells were up to 180 barrels per day. The wells were pumped with individual gas engine units.

REFERENCE - Matteson, L. S., and Busch, D. A., 1944, Pa. Geol. Survey, 4th ser., Special Bull. 1; McGlade, W. G., 1967, Pa. Geol. Survey, 4th ser., Min. Resource Rept. 54.

WASHINGTON COUNTY, PENNSYLVANIA

FIELD NAME Burgettstown FIELD NO. 169
LOCATION: Township Cross Creek, Jefferson and Smith
County Washington 7 1/2' Quadrangle Avella and Midway
DISCOVERY DATE & WELL 1890

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	3975		
Total	3975		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	2070	9 to 12	8	8-1/4, 6-1/4	300, 1200

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
WELL SPACING 400 to 600 feet

SAND CHARACTERISTICS - The Hundred Foot sand is hard, fine to coarse grained. Some wells have a pay in the top and one in the bottom of the sand. These are separated by a hard, tight sand.

OPERATIONS - Some water flooding has been tried with no effect on production. Repressuring with gas was also tried, but with no success. On the Tope Estate, an operator had the wells under vacuum.

REMARKS - The field might be tested further for repressuring and perhaps with water flooding. None of the wells were very large producers, seldom exceeding 100 barrels per day. Most of the wells were pumped by gas engines. Some were pumped by pumping jacks with individual engines. Very little salt water is produced and there is no known fresh-water flooding of wells.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Shaw, E. W., and Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 177; data from present operators in the field.

WASHINGTON COUNTY, PENNSYLVANIA

FIELD NAME Cannonsburg FIELD NO. 174
LOCATION: Township Chartiers, Cecil, and North Strabane
County Washington 7 1/2' Quadrangle Cannonsburg
DISCOVERY DATE & WELL 1888

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Gordon Stray	98		
Gordon	273		
Fifth	1616		
Total	1987		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Gordon Stray	2200	30	7	10, 8 $\frac{1}{4}$,	500 (below Pgh Coa
Gordon	2275	30	8	6-5/8,	0 (below gas san
Fifth	2400	13	10		1550 (in Big Lime)

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
WELL SPACING 200 to 800 feet

SAND CHARACTERISTICS - The Gordon sand is fine to medium grained with a softer pay streak. The Fifth is usually hard and fine grained with a pebbly pay.

OPERATIONS - Secondary recovery operations have not been tried in this area.

REMARKS - Initial productions from the Gordon were as high as 400 barrels per day and from the Fifth, up to 350 barrels. An average from both sands was 25 to 30 barrels. Future production by secondary recovery is unlikely. This is essentially a gas field.

REFERENCE - Anonymous; 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Shaw, E. W., and Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 177; data from present operators in the field.

WASHINGTON COUNTY, PENNSYLVANIA

FIELD NAME Cecil and Mawhinney FIELD NO. 175
LOCATION: Township Cecil
County Washington 7 1/2' Quadrangle Cannonsburg
DISCOVERY DATE & WELL 1895

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	294		
Total	294		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	2100	80	9	10, 8-1/4, 6-1/4	200, 950, 1350

PRODUCING WELLS None ABANDONED WELLS All
WELL SPACING About 500' between wells

SAND CHARACTERISTICS - The Hundred Foot sand is quartzose, very fine to coarse grained, and conglomeratic with a few interbedded shale beds. The pay is usually in the top of the sand and is light gray, coarse, loose and conglomeratic.

OPERATIONS - Secondary recovery operations have not been tried in this field.

REMARKS - The Hundred Foot sand in this area is completely flooded by fresh water and the field is entirely inactive. The best well (Mawhinney No. 2) came in at 160 barrels per hour from a depth of 2257 feet. The Cecil field was discovered soon after the Mawhinney No. 2 was drilled in. This field is about 200 acres in size.

REFERENCE - Shaw, E. W., and Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 177; data from former operators in the field.

WASHINGTON COUNTY, PENNSYLVANIA

FIELD NAME Chambers FIELD NO. 188
 LOCATION: Township Amwell and South Franklin
 County Washington 7 1/2' Quadrangle Amity, Prosperity, and
Washington East
 DISCOVERY DATE & WELL 1899

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Fifth	1875		
Total	1875		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Fifth	3000	25	10	10, 8-1/4, 6-5/8	600, 1300, 1600

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
 WELL SPACING 600 feet

SAND CHARACTERISTICS - The Fifth sand is light gray, medium grained and frequently conglomeratic.

In 1942, northeast of Pleasant Grove, gas repressuring in the Fifth was OPERATIONS - tried at 70 to 80 p.s.i. pressure. Production from 6 wells increased from 50 to 140 barrels per month, and from 5 others the production increased from 70 to 120 barrels per month. Also northwest of Prosperity (Craft Creek), repressuring was tried, but with no success. The sand was too tight to take the 300 to 350 p.s.i. pressure. This project may be tried again. It is also reported that a Big Dunkard sand repressuring project was tried for 3 or 4 years, but with no success. Around 100 p.s.i. pressure was used.

REMARKS - Most wells produce some salt water in varying amounts. The wells are pumped by individual gas engines.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); McGlade, W. G., 1967, Pa. Geol. Survey, 4th ser., Min. Resource Rept 54; data from present operators in the field.

WASHINGTON COUNTY, PENNSYLVANIA

FIELD NAME Crafts Run FIELD NO. 186
LOCATION: Township Morris and South Franklin
County Washington 7 1/2' Quadrangle Prosperity
DISCOVERY DATE & WELL 1899

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Little Dunkard	449		
Fifth	598		
Total	1047		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
L. Dunkard	1000	15	8	10,	600,
Fifth	2750	20	7	8-1/4,	1300,
				6-5/8	1600

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
WELL SPACING 600 feet

SAND CHARACTERISTICS - The Little Dunkard sand is a fine-to coarse-grained sandstone whose grains are poorly sorted. The Fifth sand is light gray, medium grained and frequently conglomeratic.

In 1942, northeast of Pleasant Grove, gas repressuring in the Fifth was OPERATIONS - tried at 70 to 80 p.s.i. pressure. Production from 6 wells increased from 50 to 140 barrels per month and from 5 others the production increased from 76 to 120 barrels per month. Also northwest of Prosperity (Craft Creek), repressuring was tried, but with no success. The sand was too tight to take the 300 to 350 p.s.i. pressure. This project may be tried again. It is also reported that a Big Dunkard sand repressuring project was tried for 3 or 4 years, but with no success. Around 100 p.s.i. pressure was used.

REMARKS - Most wells produce some salt water in varying amounts. The wells are pumped by individual gas engines.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); McGlade, W. G., 1967, Pa. Geol. Survey, 4th ser., Min. Resource Rept. 54; data from present operators in the field.

WASHINGTON COUNTY, PENNSYLVANIA

FIELD NAME Finleyville FIELD NO. 177

LOCATION: Township Union

County Washington 7 1/2' Quadrangle Bridgeville and Hackett

DISCOVERY DATE & WELL 1894, #1 West Frye Hrs., big well

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
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Gantz	81		
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Total	81		
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Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
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Gantz	2000	38	10	8, 6-5/8	690, 1480
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PRODUCING WELLS Unknown ABANDONED WELLS Unknown

WELL SPACING 400 feet

SAND CHARACTERISTICS - The Gantz sand is a fine-to coarse-grained sandstone with occasional pebble beds and is light gray in color.

OPERATIONS - Secondary recovery has never been tried in this field.

REMARKS - Very little information available on this field. A well drilled 20 years after the discovery well had an initial production of 20 barrels a day. The wells were pumped with individual gas engine units.

REFERENCE - McGlade, W. G., 1967, Pa. Geol. Survey, 4th ser., Min. Resource Rept. 54.

WASHINGTON COUNTY, PENNSYLVANIA

FIELD NAME Florence - Five Points FIELD NO. 167
LOCATION: Township Hanover, Smith (Hanover)
County Washington (Beaver) 7 1/2' Quadrangle Burgettstown, Clinton
DISCOVERY DATE & WELL 1889, Armour #1

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	4062		
Total	4062		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	1900	17	8	10, 8-1/4, 6-5/8, 4-7/8	50, 600, 1100, 1300

PRODUCING WELLS	<u>Unknown</u>	ABANDONED WELLS	<u>Unknown</u>
WELL SPACING	<u>600 to 1000 feet</u>		

SAND CHARACTERISTICS - The Hundred Foot is a white to gray, fine-to coarse-grained sandstone, with a coarse and pebbly pay. Sometimes the sand has a pay in the top and one in the bottom. These are separated by a hard, tight sand zone.

OPERATIONS - Air or gas repressuring has been tried at a pressure of 500 p.s.i., but no favorable results were obtained.

REMARKS - Initial productions in most wells were about 15 barrels per day, but some made as high as 120 barrels. Very little salt water has been encountered. No known fresh-water flooding of the wells exists. Most of the wells were pumped by individual gas engines.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Shaw, E. W., and Munn, M. J., 1911a, U. S. Geol. Survey, Geol. Atlas 177; data from present operators in the field.

WASHINGTON COUNTY, PENNSYLVANIA

FIELD NAME Lagonda FIELD NO. 185
 LOCATION: Township South Franklin
 County Washington 7 1/2' Quadrangle Claysville and Rogersville
 DISCOVERY DATE & WELL 1899

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Gordon Stray	200		
Gordon	88		
Fifth	941		
Total	1229		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Gordon Stray	2600	30	8	10,	600,
Gordon	2640	40	6	8-1/4,	1300,
Fifth	2750	20	5	6-5/8	1600

PRODUCING WELLS Unknown ABANDONED WELLS Unknown

WELL SPACING 300 to 1000' (average 700)

SAND CHARACTERISTICS - The Gordon Stray is a white, gray, or reddish, lenticular sandstone. The Gordon is a succession of layers of light gray, quartzose, fine- to coarse-grained sandstone, containing occasional lenses of conglomerate. The Fifth sand is light gray, medium grained and frequently conglomeratic.

OPERATIONS - In 1942, northeast of Pleasant Grove, gas repressuring in the Fifth was tried at 70 to 80 p.s.i. pressure. Production from 6 wells increased from 50 to 140 barrels per month and from 5 others the production increased from 76 to 120 barrels per month. Also northwest of Prosperity (Craft Creek), repressuring was tried, but with no success. The sand was too tight to take the 300 to 350 p.s. pressure. This project may be tried again. It is also reported that a Big Dunkard sand repressuring project was tried for 3 or 4 years, but with no success. Around 100 p.s.i. pressure was used.

REMARKS - Most wells produce some salt water in varying amounts. The wells are pumped by individual gas engines.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); McGlade, W. G., 1967, Pa. Geol. Survey, 4th ser., Min. Resource Rept 54; data from present operators in the field.

WASHINGTON COUNTY, PENNSYLVANIA

FIELD NAME McMurray FIELD NO. 176
 LOCATION: Township N. Strabane, Peters (Bethel Park)
 County Washington (Allegheny) 7 1/2' Quadrangle Bridgeville, Cannonsburg,
Hackett, Washington East
 DISCOVERY DATE & WELL About 1888

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Hundred Foot	1203		
Gordon	467		
Total	1670		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Hundred Ft.	2150	80	7 to 8	10,	300,
Gordon	2400	22	5	8-1/4, 6-5/8	1175, 1400

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
 WELL SPACING 200 to 800 feet

SAND CHARACTERISTICS - The Hundred Foot sand ranges from a very fine to coarse-grained sandstone, conglomeratic in places, with some interbedded shale beds. The Gordon sand is light gray to white, very fine to coarse grained with conglomeratic and coarse-grained sandstones in thin beds.

OPERATIONS - No secondary recovery has been tried in this field.

REMARKS - Initial productions of early wells were as high as 85 barrels per day, and some recent wells have started at 15 barrels. About all of the field is inactive. Some salt water is encountered. The ratio of produced salt water to oil from the Hundred Foot is about 4 to 1.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Fettke, Charles R., Stephenson, Robert C., and Tignor, E. M., 1946, Pa. Geol. Survey, 4th ser., Min. Resource Rept. 28; McGlade, William G., 1967, Pa. Geol. Survey, 4th ser., Min. Resource Rept. 54; data from present operators in the field.

WASHINGTON COUNTY, PENNSYLVANIA

FIELD NAME Pleasant Grove FIELD NO. 202
 LOCATION: Township East Findley
 County Washington 7 1/2' Quadrangle Claysville and Prosperity
 DISCOVERY DATE & WELL 1899

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Gordon Stray	400		
Gordon	156		
Fourth	623		
Total	1179		

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Gordon Stray	2600	30	8	10	600
Gordon	2640	40	6	8-1/4	1300
Fourth	2700	25	10	6-5/8	1600

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
 WELL SPACING 700 feet

SAND CHARACTERISTICS - The Gordon Stray is a white, gray, or reddish, lenticular sandstone. The Gordon is a succession of layers of light-gray, quartzose, fine- to coarse-grained sandstone, containing occasional lenses of conglomerate. The Fourth sand is light gray, medium grained and frequently conglomeratic.

In 1942, northeast of Pleasant Grove, gas repressuring in the Fifth was
OPERATIONS - tried at 70 to 80 p.s.i. pressure. Production from 6 wells increased from 50 to 140 barrels per month and from 5 others the production increased from 76 to 120 barrels per month. Also northwest of Prosperity (Craft Creek), repressuring was tried, but with no success. The sand was too tight to take the 300 to 350 p.s.i. pressure. This project may be tried again. It is also reported that a Big Dunkard sand repressuring project was tried for 3 or 4 years, but with no success. Around 100 p.s.i. pressure was used.

REMARKS - Most wells produce some salt water in varying amounts. The wells are pumped by individual gas engines.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); McGlade, W. G., 1967, Pa. Geol. Survey, 4th ser., Min. Resource Rept. data from present operators in the field.

WASHINGTON COUNTY, PENNSYLVANIA

FIELD NAME Point Lookout FIELD NO. 187
LOCATION: Township Morris, North Franklin and South Franklin
County Washington 7 1/2' Quadrangle Prosperity, Washington East,
Washington West
DISCOVERY DATE & WELL 1919, Reed #1

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Fifth	1875		

Total	1875
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Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Fifth	2750	20	6	10, 8-1/4, 6-5/8	600, 1300, 1600

PRODUCING WELLS Unknown ABANDONED WELLS Unknown

WELL SPACING 800 feet

SAND CHARACTERISTICS - The Fifth sand is white, but not as coarse as the Fourth. One pay is in the top of the sand and a second is about 15 feet below the first. The sand is medium grained and frequently conglomeratic.

OPERATIONS - Secondary recovery operations have not been tried.

REMARKS - The Fifth sand wells had initial productions of around 30 barrels a day. No fresh-water flooding out of the wells is known. The wells are pumped by individual gas engines.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); McGlade, W. G., 1967, Pa. Geol. Survey, 4th ser., Min. Resource Rept. 54; data from present operators in the field.

WASHINGTON COUNTY, PENNSYLVANIA

FIELD NAME Venice FIELD NO. 173
 LOCATION: Township Cecil, Mt. Pleasant (South Fayette)
 County Washington (Allegheny) 7 1/2' Quadrangle Cannonsburg
 DISCOVERY DATE & WELL 1893

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Fifty Foot	635	Gordon	66
Gordon Stray	99	Fourth	3405
Total			4205

Sands	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Fifty Ft.	2100	45	9	10,	150,
Gordon Stray	2200	15	7	8-1/4,	1125,
Gordon	2275	25	8	6-5/8,	1330
Fourth	2330	20	9	5-3/16	2100

PRODUCING WELLS Unknown ABANDONED WELLS Unknown
 WELL SPACING 400 to 800 feet (average 600)

SAND CHARACTERISTICS - The Fifty Foot is a quartzose, very fine to coarse-grained, conglomeratic sandstone, with a few interbedded shales. The Gordon Stray is a white gray or reddish sandstone. The Gordon sand ranges from a fine-grained to a coarse-grained conglomeratic sandstone. The best Gordon sand wells have a coarse, pebbly pay. The Fourth sand is gray to grayish brown, fine to coarse grained, occasionally conglomeratic, and irregularly shaly. The pay is usually found in the medium- to coarse-grained "sugary" sand. Pebbles or cobbles are of various sizes and shapes.

OPERATIONS - Some secondary operations have been tried in the Fourth sand, near the town of Venice. The 5-3/16-inch casing is used only where much water is encountered in the Fifty Foot and Gordon sands.

REMARKS - The wells are pumped with individual gas engine units. Maximum initial productions were as high as 2000 barrels per day with an overall average of 200 barrels. During the last 20 years an initial production over 10 barrels is rare. Some salt water is produced from the Gordon, and also a small amount is found in the Fifty Foot and Fourth sands. Future possible production will no doubt have to be confined to existing wells because of the high cost of drilling new wells for secondary recovery operations.

REFERENCE - Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Ingham, A. I. and others, 1949, Pa. Geol. Survey, 4th ser., Min. Resource Rept. 29; data from present operators in the field.

WASHINGTON COUNTY, PENNSYLVANIA

FIELD NAME Washington-Taylorstown (includes Linden) FIELD NO. 183, 181
LOCATION: Township Buffalo, N. & S. Franklin, Canton, Blaine, N. & S. Strabane & Amwell
County Washington 7 1/2' Quadrangle Hackett, Prosperity,
Washington East, Washington West, and West Middleton
DISCOVERY DATE & WELL 1885, Gantz well

FIELD DATA

Producing Sands	Acres	Producing Sands	Acres
Gantz	4,803	Fourth	2,336
Gordon	9,463	Fifth	6,978
Total			23,580

	Av. depth to sand (ft.)	Av. sand thickness (ft.)	Av. pay thickness (ft.)	Size of casing (in.)	Av. length of casing (ft.)
Sands					
Gantz	2200	12	7	13, 10,	40 to 60,
Gordon	2525	25	6	8-1/4,	600 to 700,
Fourth	2600	20	7	5-3/16,	1400, 1800,
Fifth	2650	20	8		2500

PRODUCING WELLS	Unknown	ABANDONED WELLS	Unknown
WELL SPACING	300 to 1000 feet (average 700)		

SAND CHARACTERISTICS - The Gantz is a light-gray, quartzose, fine-to coarse-grained sandstone. It is conglomeratic in places, and contains a few interbedded shale beds. The Gordon is a succession of layers of light, gray, quartzose, fine- to coarse-grained sandstone, containing occasional lenses of conglomerate. The Fourth is a light-gray, medium-grained sandstone, frequently conglomeratic. The Fifth is similar to the Fourth, but contains thicker conglomeratic lenses.

OPERATIONS - Gas drive was started in 1923 in the Gordon sand. Recovery by this method has been as high as 100 barrels per acre foot. The Gantz responds very little to gas repressuring, because of the low permeability. A core report for the Gordon sand shows: Permeability - 93.56 millidarcies, porosity - 20 percent.

REMARKS - Possibly the Fourth and Fifth sands will respond to repressuring as well as the Gordon. The maximum initial productions are as follows: Gantz - 500, Fourth - 1000, and Fifth - 80 barrels. Some connate water is found in the Gordon, but none in the others where they are productive. The Linden field consists of 62 acres of Hundred Foot sand.

REFERENCE -Anonymous, 1941, Report to the Petroleum Coordinator for National Defense (Unpublished); Clapp, F.G., 1907a, U.S. Geol. Survey, Geol. Atlas 144; Pettke, Charles R., Stephenson, Robert C., and Tignor, E.M., 1946, Pa. Geol. Survey, 4th ser., Min. Resource Rept. 28; Munn, M.J., 1911b, U.S. Geol. Survey, Geol. Atlas 180; McGlade, W.G., 1967, Pa. Geol. Survey, 4th ser., Min. Resource Rept. 54.

FIELDS BY NAME

FIELD NAME	FIELD NO.	COUNTY	PAGE
Alameda Park-Crooked Run	147	Butler	69
Amity.	200	Washington	102
Annisville-Ferris.	125	Butler	70
Aten	29	Allegheny.	30
Bakerstown	8	Allegheny (Butler) . . .	31
Bellevue-Avalon.	21	Allegheny.	32
Branchton.	136	Butler	71
Brenner.	111	Beaver	57
Brownsdale-Meharg.	156	Butler	72
Brush Creek.	1	Allegheny (Butler) . . .	33
Bullion-Clintonville	124	Butler	73
Butler Cross Belt.	131	Butler (Armstrong) . . .	74
Burgettstown	169	Washington	103
Byram.	127	Butler	75
Callery-Watters.	152	Butler	76
Cannonsburg.	174	Washington	104
Carson	117	Beaver	58
Cecil-Mawhinney.	175	Washington	105
Chambers	188	Washington	106
Chartiers.	35	Allegheny.	34
Cherry Valley.	126	Butler	77
Chicora.	142	Butler	78
College Hill-Beaver Falls. . . .	108	Beaver	59
Cookson.	122	Beaver	60
Coraopolis-Moon.	26	Allegheny.	35
Crafts Run	186	Washington	107
Crider-Duncan.	164	Butler (Allegheny) . . .	79
Crows Run.	112	Beaver (Allegheny) . . .	61
Dorseyville.	17	Allegheny.	36
Duff City.	2	Allegheny.	37
Economy-Legionville.	121	Beaver (Allegheny) . . .	62
Elder.	104	Beaver	66
Emlenton-Richey Run.	128	Butler	80
Evans City	151	Butler	81
Ewings Mill.	33	Allegheny.	38
Finleyville.	177	Washington	108
Florence-Five Points	167	Washington (Beaver). . .	109
Garvin	165	Butler	82
Glade Mills.	162	Butler	89
Glade Run.	153	Butler	83
Glenfield-Mt. Nebo	23	Allegheny.	39
Glenshaw	20	Allegheny.	40
Harbinson Hollow	107	Beaver	63
Harmony-Zelienople	150	Butler (Beaver).	84
Hooker	132	Butler	85
Hookstown.	116	Beaver	64
Hoover	135	Butler	86

FIELD NAME	FIELD NO.	COUNTY	PAGE
Imperial	31	Allegheny.	41
Ingomar-Grubbs	3	Allegheny.	42
Jefferson Center-Herman.	145	Butler	87
Kendall.	118	Beaver	65
Lagonda.	185	Washington	110
Leetsdale.	24	Allegheny (Beaver)	43
Licksillet-Hopper	38	Allegheny.	44
Linden	181	Washington	115
Little Creek	148	Butler	88
Madden Run	102	Beaver	66
Mars	163	Butler	89
McCormick.	30	Allegheny.	45
McDonald-McCurdy	32	Allegheny (Washington)	46
McMurray	176	Washington (Allegheny)	111
Millerstown.	10	Allegheny (Butler)	47
Milltown	16	Allegheny.	48
Moon Run-Crafton	34	Allegheny.	49
Muddy Creek.	138	Butler	90
Neville Island	22	Allegheny.	50
New Galilee.	103	Beaver	66
New Texas.	46	Allegheny.	51
Oneida	140	Butler	91
Parker	130	Butler (Armstrong)	92
Pleasant Grove	202	Washington	112
Point Lookout.	187	Washington	113
Purdy.	101	Beaver	66
Queen Junction	139	Butler	93
Rattigan	143	Butler	94
Rattlesnake.	59	Armstrong.	56
Renfrew-McCalmont.	154	Butler	95
Rennerdale	36	Allegheny.	52
Rosenberry	129	Butler	96
Rough Run.	144	Butler	97
Rural Ridge.	9	Allegheny.	53
Sandle-Wildwood.	6	Allegheny.	54
Saxonburg.	158	Butler	98
Shannopin.	120	Beaver (Allegheny)	67
Shira Streak	134	Butler	99
Smith's Ferry.	115	Beaver	68
Thorn Creek.	155	Butler	100
Valencia	5	Butler	89
Venice	173	Washington (Allegheny)	114
Wadsworth-North Oakland.	141	Butler	101
Washington-Taylorstown	183	Washington	115
Woodville.	37	Allegheny.	55

FIELDS BY NUMBERS

FIELD NO.	FIELD NAME	COUNTY	PAGE
1	Brush Creek	Allegheny (Butler) . . .	33
2	Duff City	Allegheny.	37
3	Ingomar-Grubbs.	Allegheny.	42
5	Valencia.	Butler	89
6	Sandle-Wildwood	Allegheny.	54
8	Bakerstown.	Allegheny (Butler) . . .	31
9	Rural Ridge	Allegheny.	53
10	Millerstown	Allegheny (Butler) . . .	47
16	Milltown.	Allegheny.	48
17	Dorseyville	Allegheny.	36
20	Glenshaw.	Allegheny.	40
21	Bellevue-Avalon	Allegheny.	32
22	Neville Island.	Allegheny.	50
23	Glenfield-Mt. Nebo.	Allegheny.	39
24	Leetsdale	Allegheny (Beaver) . . .	43
26	Coraopolis-Moon	Allegheny.	35
29	Aten.	Allegheny.	30
30	McCormick	Allegheny.	45
31	Imperial.	Allegheny.	41
32	McDonald-McCurdy.	Allegheny (Washington) .	46
33	Ewings Mill	Allegheny.	38
34	Moon Run-Crafton.	Allegheny.	49
35	Chartiers	Allegheny.	34
36	Rennerdale.	Allegheny.	52
37	Woodville	Allegheny.	55
38	Licksillet-Hopper.	Allegheny.	44
46	New Texas	Allegheny.	51
59	Rattlesnake	Armstrong.	56
101	Purdy	Beaver	66
102	Madden Run.	Beaver	66
103	New Galilee	Beaver	66
104	Elder	Beaver	66
107	Harbinson Hollow.	Beaver	63
108	College Hill-Beaver Falls . . .	Beaver	59
111	Brenner	Beaver	57
112	Crows Run	Beaver (Allegheny) . . .	61
115	Smith's Ferry	Beaver	68
116	Hookstown	Beaver	64
117	Carson.	Beaver	58
118	Kendall	Beaver	65
120	Shannopin	Beaver (Allegheny) . . .	67
121	Economy-Legionville	Beaver (Allegheny) . . .	62
122	Cookson	Beaver	60
124	Bullion-Clintonville.	Butler	73
125	Annisville-Ferris	Butler	70
126	Cherry Valley	Butler	77
127	Byram	Butler	75
128	Emlenton-Richey Run	Butler	80

FIELD NO.	FIELD NAME	COUNTY	PAGE
129	Rosenberry	Butler	96
130	Parker	Butler (Armstrong) . . .	92
131	Butler Cross Belt.	Butler (Armstrong) . . .	74
132	Hooker	Butler	85
134	Shira Streak	Butler	99
135	Hoover	Butler	86
136	Branchton	Butler	71
138	Muddy Creek.	Butler	90
139	Queen Junction	Butler	93
140	Oneida	Butler	91
141	Wadsworth-North Oakland.	Butler	101
142	Chicora.	Butler	78
143	Rattigan	Butler	94
144	Rough Run.	Butler	97
145	Jefferson Center-Herman.	Butler	87
147	Alameda Park-Crooked Run	Butler	69
148	Little Creek	Butler	88
150	Harmony-Zelienople	Butler (Beaver).	84
151	Evans City	Butler	81
152	Callery-Watters.	Butler	76
153	Glade Run.	Butler	83
154	Renfrew-McCalmont.	Butler	95
155	Thorn Creek.	Butler	100
156	Brownsdale-Meharg.	Butler	72
158	Saxonburg.	Butler	98
162	Glade Mills.	Butler	89
163	Mars	Butler	89
164	Crider-Duncan.	Butler (Allegheny) . . .	79
165	Garvin	Butler	82
167	Florence-Five Points	Washington (Beaver). . .	109
169	Burgettstown	Washington	103
173	Venice	Washington (Allegheny) .	114
174	Cannonsburg.	Washington	104
175	Cecil-Mawhinney.	Washington	105
176	McMurray	Washington (Allegheny) .	111
177	Finleyville.	Washington	108
181	Linden	Washington	115
183	Washington-Taylorstown	Washington	115
185	Lagonda.	Washington	110
186	Crafts Run	Washington	107
187	Point Lookout.	Washington	113
188	Chambers	Washington	106
200	Amity.	Washington	102
202	Pleasant Grove	Washington	112

